

SUGARING IN THE FALL *reprinted from Farming, Journal of Northeast Agriculture September, 2009*

Sugarmakers, always looking for ways to increase sap production, have made constant modifications and improvements to vacuum systems, tubing and spouts. Extending the sugaring season is another approach to increasing yields. With tubing already set up in the woods, wouldn't it make sense to use the collection system for more than a total of four to eight weeks? For at least 35 years, researchers have explored fall tapping as a means of increasing maple profits, and recently some producers using modern systems with high vacuum have tested this approach. There are many issues to consider.

The maple literature contains several descriptions of experiments in fall sap collection from the early days of tubing and vacuum, and most results were not promising. While researchers in the 60's almost always put paraformaldehyde tablets in their tapholes, yields were very low. Fall sap volume collected by gravity or vacuum in various studies was reported to be none (1969), 1 gallon per taphole, 3.8 gallons per taphole, 15% of the spring total, and 33% of the spring total. Researchers noted the low sugar content (about 2/3 of the spring sugar content), and potential "taphole spacing problems." The latter problem arises when sugarmakers re-tap their trees with new holes in the spring, rather than reaming the existing hole in the spring (enlarging and deepening with the objective of using a larger spout). It was suggested that sugarmakers interested in fall sap collection begin by tapping a portion of their woods to determine if fall weather conditions were favorable for sap flow in their region.

Of all the obstacles to fall sap collection, weather is probably the most important. The number of freeze-thaw cycles in the fall is the greatest unknown, and the real determining factor in the success or failure of any fall tapping program. Weather conditions in the fall differ from conditions in March and April, which are the prime sugaring months in Vermont. Day length is shorter during the fall season. If the middle of the fall sap collecting period is considered to be November 15, that date is only 36 days from the winter solstice, the shortest day of the year, while March 20 (about the middle of the Vermont spring sap season) is 89 days past the winter solstice. The fall is often cloudier in Vermont than the spring. A heat wave, when temperatures reach 60 degrees and ends the season due to bacterial growth in the taphole, is at least as likely in November as in March. Lack of deep snow in the fall makes tapping easier, while melting snow in the spring ensures good soil moisture. Trees are usually frozen almost solid in the beginning of the spring season, unfrozen in the fall.

With vastly improved sap collection methods and materials compared to the 60's, could fall tapping now be economically viable? Sugarmakers from three large Vermont maple operations who experimented with fall tapping in the past few years can provide some valuable information to others about this subject. The sugarmakers I spoke to were Dan Crocker, located in Southeastern Vermont, with 24,000 taps; Tim Young, located in North Central Vermont, with 10,000 taps, and Russell Senseac, located in Northwestern Vermont with 12,000 taps. There were several concerns expressed by these three producers, two of whom claimed that they would no longer attempt fall tapping.

Dan Crocker uses stainless spouts, and tapped with the intention of reaming the holes 1/16<sup>th</sup> to 1/8<sup>th</sup> inch larger in the spring. His fall collection, with an average sugar content of 0.9% brix, consisted of one good sap run, 2 lesser runs—then a warm spell in December that ended fall sap runs. Some fall taps ran well in February, but later most of the fall tapholes, even when reamed out, produced "slimy and cloudy" sap. Reaming took too long, a lot of the holes leaked, and there was a tendency to pound the spouts in too hard to try to overcome leaks. Dan reported that he would not continue fall tapping.

Tim Young tapped in the fall for two years, with good volumes collected in the first fall, poor volumes in the second fall. Tapholes were not reamed; all trees were retapped in the spring, and a new spout extension was added at this time. Sugar content averaged 1% to 1 ¼ % brix in the fall. Tim reported that he would not continue fall tapping.

Russell Senesac of Fairfax and Dan Branon of Fairfield each put in about 2500 taps in the fall of 2008, with all the sap going to Dan's large evaporator. Weather was favorable and yields averaged about a quart of syrup per tap, which represented a considerable amount of sap given the low sugar content. In the spring, these trees yielded 0.4 gallons of syrup per tap. In the fall ¼" spouts (clear, LaPierre) were installed, replaced with a 5/16" spout in March after the hole had been enlarged and deepened. Both men plan to continue fall tapping in 2009.

In my conversations with these producers, there were several repeated themes: 1) Sap sugar content was low, but with reverse osmosis this was not the issue that it would have been in the 60's; 2) tapping in the fall was convenient due to lack of deep snow; 3) reaming tapholes was not a perfect solution, as it was difficult to make a round hole on top of a smaller round hole—thus vacuum leaks at the taphole were a common problem; 4) when revisiting a stand that was already tapped in, with no spouts dangling, it was not easy to tell which holes had been reamed and which had yet to be visited. "it came down to watching your footprints (Senesac)." 5) in the case of Senesac and Branon, the evaporator they were feeding was quite large and the sap runs from the portion of the woods tapped were often small—so they often had to hold onto sap for several days until they had enough to boil. This led to a deterioration of sap quality. 6) reaming required a second, larger spout and retapping required a spout extension or different spout to avoid placing a dirty spout in the spring taphole.

Finally, a few questions remain unexplored. If fall sap collection is successful, can the tree sustain the removal of this much sugar year after year? Is the wound, particularly the internal wood staining, resulting from a fall taphole that is reamed in the spring more extensive than the wound from a spring taphole? Are there materials, for example the new check valve spout, that would allow a taphole placed in the fall to run through the spring? Research, and careful exploration by sugarmakers may help to answer these questions soon.