

Results from the 2007 tapping survey

Tim Wilmot
University of Vermont Extension Maple Specialist
Proctor Maple Research Center

The results described here are from 133 producers who sugared this year, 95% of them Vermonters; this happens to be the same number of sugarmakers who answered in 2006, but are not necessarily the same people. This survey will be repeated in 2008. Next spring I would be happy to include any sugarmaker who wants to participate; all I need is an email address.

Many thanks to all who contributed this year. Your answers help everyone.

Again, the data provide an interesting glimpse into this year's maple production, but certainly don't answer all our questions about what works best in terms of sap collection. Not all questions on the survey were filled in by all respondents, in addition, quite a bit of information is just not available. For example, many people collected sap using a combination of 2 or 3 methods, so that yields do not reflect just the sap from, for example, tubing without vacuum using large spouts, but a combination of that, plus some buckets, plus some collection by vacuum. Some producers may have state-of-the-art collection systems, but did not collect as much as producers in other parts of the state with older equipment, because the weather was far from uniform across the state, or even across a single town.

The total number of taps in 2007 put out by survey respondents was 373,270; of this, 314,681 or 84% were on vacuum; 40,102 or 11% were on tubing without vacuum, and 18,487 or 5% were buckets. There were 26 producers on vacuum with at least 3000 taps, 11 producers using tubing without vacuum with at least 1000 taps, and 9 producers with at least 500 buckets. There were also 12 producers with less than 300 taps total.

In this survey, the 2007 sap yield ranged from .06 gallons of syrup per tap to .59 gal/tap, although a few people just wrote "very poor" or "horrid". The average was .224; last year it was .217. The "normal" average reported for all years (97 people answered this one) was .255, and for these same 97 the yield in 2007 was .218, so again like 2006, this wasn't a great year on the whole for those responding. 24 people did better than their average, and 55 did worse than average. 10 people made only 50% or less of their average and 7 of these were collecting by gravity. In terms of geographic variation, the southern part of the state apparently had a worse season than the northern part; only 4 producers from the southern 4 counties did better than average, while 17 did worse. There were, however, producers from almost every county who reported a poor year, so local topography seems to have been a factor as well as latitude.

In 2007 the average yield for producers using buckets only was .154 gal/tap, average yield for tubing without vacuum was .165 gal/tap, and average yield for tubing with vacuum was .268 gal/tap. Only 7 out of 37 producers who were collecting in buckets or tubing without vacuum made more than .2 gal/tap this year.

In terms of size of operation, when total taps was less than 1000 the average yield was .185 gallons of syrup/tap; for 1000-4999 taps average yield was .245 gal/tap; for 5000 or more, the average was .261 gal/tap

When tapped:

The best time to tap this year was difficult to predict, as the season started late after our extended fall weather. 23 producers started and/or finished tapping in February; of these only 2 felt that they tapped too soon, while 4 felt they tapped too late. Overall, 16 producers felt they tapped too early, 15 too late, and everyone else was satisfied with their tapping date.

For producers using vacuum, those who tapped on or before March 3 had an average yield of .341 gal/tap; while those who tapped after this averaged .242 gal/tap. This does not mean that producers who tapped before March 3 collected sap then--they did not. There are many other factors such as vacuum level, age of equipment etc., that could have contributed to yield and were not considered in this example. However, these results do show that tapping a few weeks early, and collecting by vacuum, did not lead to reduced production, at least for most producers.

At the Proctor Center I continued my experiments with early tapping, using both vacuum and gravity. Vacuum collection (> 22" Hg) was with new spouts and tubing. While I am not recommending very early tapping for general use, I again found that early tapping did not reduce, and in some cases increased (when the early January runs were captured) total seasonal sap yields compared to tapping at a traditional date. While sap flow slowed or stopped sooner in some early-tapped trees, this did not really happen until the middle of April. Some trees stopped running, but others ran quite well until the end. Meanwhile, tapholes drilled in the middle of March, while not stopping, were also slowing down.

I also collected trees using buckets and 7/16" metal spouts installed at different dates. Overall yield for buckets was 41% of the sap yield using vacuum, for trees of the same size, location and tapping date. This illustrates the difference that vacuum and new equipment made in 2007, at least here in Underhill.

Date of Last Boil:

More than one person mentioned that they boiled later in 2007 than in any previous year. For producers who reported their date of last boil, 2 said the last week of March; 3 said the first week of April, 20 said the second week of April, 72 said the third week of April, and 27 said the fourth week of April.

Forest Tent Caterpillar and sap sugar content:

Forest tent caterpillar defoliation was reported as mild by 18 producers, moderate by 15, and severe by 14. In stands with moderate or severe FTC defoliation, the number of producers reporting below-normal sweetness was fewer than the number of producers reporting below-normal sweetness and no FTC damage—this was a surprise. Lower than normal sugar content was reported by about 75% of all producers, and while some of the causes may remain a mystery, heavy seed crops in 2006 were probably a contributing factor. It was interesting to note that some producers with sap sugar concentrations as

high as 2.5-2.8% in 2007 said this was below normal, while others with concentrations as low as 1.8% said that this was normal.

Spout size, age and type:

Only two producers using vacuum used 7/16" spouts in 2007 (a few used older 7/16" spouts but reduced the hole size with an adaptor). Most people collecting with tubing without vacuum are also using small spouts; those who are still using large spouts are invariably using old spouts. Bucket collectors mostly use old metal 7/16" spouts.

Producers collecting with vacuum and using spouts and/or adaptors that were 2 or less years old averaged .303 gal/tap; producers using spouts/or adaptors 3 years old or older averaged .245 gal/tap. These results are very similar to last year's; however, they should be treated with some caution, as other factors which I'm not accounting for, such as better tubing layout or better pumps, may have accompanied the newer spouts. Several people using adaptors commented that they thought their holes ran longer than those without adaptors.

41 producers use adaptors on some or all of their taps and 7 of these people throw the adaptor away each year.

Nine producers used some or all stainless steel spouts, but because this group varied so much in terms of vacuum level and other factors, there was not enough data to compare sap production between SS and plastic.

The most popular brands of plastic spouts are IPL, and Leader, and stubby two-piece spouts made by various manufacturers are gaining ground.

Most people expressed satisfaction with their spouts; the few complaints included some older small spouts that break down in sunlight, adaptors that are hard to separate from the spout, and leaks between the tree and spout or spout and adaptor.

Vacuum levels:

The average at the pump was 20.7" mercury, with which was higher than last year. Vacuum level at the taphole was not necessarily near the vacuum level at the pump, as evidenced by reports from several people; however vacuum did seem to make a huge difference this year. For all producers reporting vacuum level at the pump less than 20 inches of mercury, average yield was .221 gal/tap. For all producers reporting more than 20 inches, average yield was .300 gal/tap.

Sap Filtering:

28 out of 81 producers who filtered sap had some problems doing so this year. Types used included bag (the most common method) paper pre-filter, R/O cartridge, LaPierre canister type filter, milk sock, metal screen, house-type water filter, and pool filter with diatomaceous earth (one producer). The paper pre-filter generally did not work well; the canister filter generally did work well, and for other types the results were mixed.

The best research to date on the effectiveness of sap filtering was done recently by Simon Lachance of Alfred University in Ontario, working also with Anna Crolla and Luc Lagace. Simon gave me permission to share his information in my tapping survey results. Types of sap filters tested included pool filters, R/O cartridges, LaPierre canisters, and bag filters. The order of effectiveness, in terms of removing bacteria, and yeasts and moulds, was the pool filter, followed by the canister filter, then the R/O cartridge, and finally the bag filter (all these filters remove larger particles such as bits of dirt and bark). The amount of bacteria removed ranged from around 40% using the pool filter, to almost none, using the bag. Yeasts and moulds, being larger, were somewhat more effectively removed by all types. In terms of when to filter, the authors emphasize that the sooner bacteria are removed, the less opportunity bacteria have to break down sucrose into invert sugars which result in darker syrup. Several precautions are given. Any procedure that warms the sap, such as extensive pumping, or holding sap in a warm room for any length of time, is counter-productive. Microorganism populations expand rapidly with temperature and filtering effects will soon be lost if the sap is not kept cool. Secondly, dirty filters can act as sources of microorganisms and contaminate clean sap—filters need to be cleaned or changed regularly and the filter housing also needs to be cleaned. Third, there is a big cost differential between operating some of these filters, with the pool filter being the most costly and technically demanding. Also, any D.E. used in a pool filter should be food grade.

How we wash tubing:

This year, 39 producers used air and water to clean tubing, 12 used some bleach as part of the wash, 10 injected pan cleaner through the spouts using the vacuum system, several pulled spouts under vacuum without injecting something; and other methods included the use of hot water, hot water and vinegar, and a cold water rinse. Some producers used a combination of methods, such as pressure washing the lines closer to the sugarhouse and injecting more distant spouts with water and pan cleaner. Unless there were comments about the effectiveness of the washing process, of which there were very few, I have to assume that most people were satisfied with their tubing cleaning results. Seven people reported not washing tubing at all; of these four use new adaptors or spouts every year.

Many methods were used to clean spouts, including baking (especially stainless steel) boiling, brushing (toothbrush, bottle brush, wire brush) flushing with or soaking in alcohol, bleach, peroxide, pan cleaner, and running them through the washing machine.

What people would do differently, if given a chance:

Many people talked about improving their vacuum system with a better pump, better lines, doing more maintenance on the lines (which was difficult once there was 3-4 feet of snow in the woods) or installing vacuum system if they have been collecting with gravity. In terms of vacuum for the small producer who might not be able to afford the necessary equipment from a maple dealer, we continue to search for and also test pumps that can be used without a releaser; but haven't come up with something adequate yet.

A few other comments:

“I missed a couple of runs on iffy days. (I thought it was too cold) I would run vacuum on those days if I had a do-over.”

“Should have broken the vacuum pump down and cleaned it prior to the season.”

“I wish I tapped a percentage in January.”

“Our seasons have been declining (in S.E. Vermont) over the years, so we do not see the production that the north is seeing. This year we did not really know if the adaptors helped. Last year we used them for the first time and we know they did help.” *And from another producer in S.E. VT* “this was the worst year I can remember, since the 1950's “

“A very poor year here-- stayed cold very long then warmed up with no freezes. The snow was so deep the trees did not get a chance to run when we had the first warm spell” *(from N. VT, high elevation)*.

“Nothing different--other than not hanging the buckets as they did not run--I got about 50% of the sap I normally get from them”

“I wish that I had tapped all of our trees before the snow came in February.”

“Many taps were not set hard enough for a good vacuum seal. I think this been a problem in past years, but the resulting leak is often subtle, and I only noticed it this year due to more thorough vacuum leak checks. The result is not only reduced vacuum, but contaminated tapholes by constantly sucking in air. I need to correct this in future years.”

“Is there a birth-control pill for squirrels?”

Workshops for the future:

Thanks for your input on this subject. There were many suggestions and we will be working on developing several of them.