

Results from 2008, the 4th annual tapping survey, are below. Thanks to all of you who sent in their data. I especially like the detailed descriptions of various problems, challenges and solutions that some of you provided.

This year 141 sugarmakers answered the survey; most were from VT, but a few were from surrounding states. The total number of taps from all participants was 420,770; of these 88% were on vacuum, 8.3% on tubing without vacuum, and 3.7% on buckets. There were 21 vacuum producers with more than 4000 taps, 9 producers with over 500 taps on tubing without vacuum, and 10 producers with over 500 buckets. There were also 23 producers with less than 500 taps total. As usual, there were many people with a mixture of 2 or 3 types of collection systems.

Here are the results from the various questions I asked:

When did you tap? This year, 26% of producers finished tapping in February. While most people felt that they tapped at the right time, 16% thought they tapped too late, and only 2% felt that they tapped too early. First boil was anywhere from January 13 (Northern Vermont) to April 7 (Northern Vermont near Canadian Border). Most people's first boil was in the first half of March. The June 2008 issue of the Maple Syrup Digest will (should) carry my article summarizing several years of research on the timing of tapping and resulting yields, all done at the PMRC.

How sweet was the sap? 53% of sugarmakers said it was 2.5% or higher, at least at the beginning of the season, although some noted that it dropped to quite un-sweet near the end of the season. 72% said their sap sugar was higher than normal, and only 4% said their sap was less sweet than normal. This was apparently a wide ranging phenomenon, with sweet sap reported well beyond Vermont, and in many areas not previously affected by the recent Forest Tent Caterpillar outbreak. The cause remains mysterious; it may be related to weather conditions in the fall.

Spout and adaptor type and age: This year only 4% of producers used large spouts for vacuum, and only 8% of producers used large spouts for tubing without vacuum. The most common makes were IPL, Leader and stubby 2 piece of various manufacture. Many bucket producers still use large spouts. 13% of vacuum producers used some or all stainless steel spouts of various manufacture. Although some people swear by stainless steel, some remarked that they are harder to insert, or remove (a good removal tool is essential with ss), or clean in the field than plastic, and the cost of losing them in the woods is much greater than with plastic.

Adaptor use has grown tremendously in the past few years. This year, 49% of sugarmakers using vacuum had adaptors in place, as did 22% of gravity tubing people, and many people use them once and throw them away. Although many people like them, some complaints about adaptors included loosening between the adaptor and spout, especially after wide temperature swings; difficulty separating the spout from adaptor, more time spent tapping and removing spouts.

Age of the spout may make a difference in sap yield. In a study at PMRC comparing yield from new and used spouts, (which had been cleaned or not cleaned to various degrees), both new stainless and new plastic spouts were superior to used spouts near the end of the season, when the weather was warm. Used spouts ran equal to new spouts during most of the season, until daytime temperatures reached 50 degrees or so; however the increased yield from new spouts at the end of the season may amount to enough savings to justify the time and money spent on a new spout or spout tip. This research will continue until more definitive data can be presented.

Tubing: most people are using tubing that is 10 years old or less; however, about 10% of producers have tubing that is from the pre-polyethylene era; in other words, it is PVC. This material is not worth keeping in the woods any longer. Droplines averaged 1.4 years newer than lateral lines, but the majority of people are not installing new droplines until they replace tubing. Preferences seem to be about equal between rigid and semi-rigid tubing, although several people said they prefer semi-rigid for drop lines. The few complaints about tubing included some UV breakdown after 5 years in “5 year tubing,” plastic smell in the sap from new tubing, and some tubing too opaque to see sap flow.

Washing tubing: Among vacuum tubing users, 35% pressure wash with air and water, 20% use just water without air pressure, 10% inject pan cleaner, 5% use chlorine with water, and 30% do not wash, although most of later pull spouts under vacuum. Among gravity tubing users, 30% pressure wash with air and water, 40% use water without air pressure, 14% use dilute chlorine, 9% use pan cleaner, and 7% do not wash. I believe that pressure washing is still the best way to find leaks in the system.

Vacuum: There has been a steady increase in vacuum levels reported, from an average of 19.6” Hg in 2006, to 20.7” in 2007, to 22.2” in 2008. For anyone still unsure about the relationship between vacuum level and sap yield, see the article from the Maple Syrup Digest, which can be viewed at the PMRC website at <http://www.uvm.edu/~pmrc/vacsap.pdf> Several people suggested a research study on the long term effects of high vacuum on the health of maple trees. This kind of study would take just that—a long term to complete; however, there are some producers who have been using high (at least 20” Hg) vacuum for 5-10 years, and we are not aware of health problems in these trees.

Syrup Yield: The average yield was .288 gallons/tap for vacuum users and .206 gallons/tap for gravity collection in tubing or buckets. This was considerably better than last year. Among vacuum users, 52% had a better than average year, 13% had an average year, and 35% had a worse than average year. With gravity collection, the percentages were 46%, 15% and 39%.

In past years I have tried to compare different technologies, for example vacuum level, or age of spouts, to yield. This year that be misleading because the weather (and snow cover) was so different across the state. For example, some producers with new spouts or adaptors and 25” of vacuum made less than .2 gallons/tap this year, while other producers using gravity only made more than .3 gallons/tap. Southern and western counties generally did quite well, especially at lower elevations, while much of the

central and northeastern part of the state did not do well, generally because of snow depth.

Energy Efficiency: this is going to be an ongoing project at the PMRC. Some of the data that you provided are quite interesting, but much more analysis remains to be done. For reverse osmosis, which was used by 46% of all the participants in this survey, the average concentration was 9.5%. This was 1.0% higher than the average reported for 2007. This may be in part due to sweeter sap coming into the r/o compared to last year, but several people concentrated 2 or more points higher than last year. The range of concentrate was 5% to 20%, and we know that there are others who are concentrating even further than this. Nine producers in this survey concentrated to 12% or higher.

Producers using r/o had an average of 72.8 taps per square foot of evaporator; producers without r/o had an average of 22.8 taps per square foot. Oil consumption ranged from .36 to 5.37 gal oil/gal syrup; with r/o it averaged .84 gal oil/gal syrup, and without r/o it averaged 3.35 gal oil/gal syrup. Use of wood to fuel the arch ranged from 9 to 240 gal syrup/cord of wood, and averaged 95.5 gal syrup/cord with r/o; and 23.3 gal syrup/cord without r/o. (no, I don't sell r/o's and yes, I know that they use electricity). Twenty six producers had steam recovery devices (steamaway or piggyback). Producers without r/o but with a steam recovery device averaged 2.19 gal oil/gal syrup, and 38.1 gal syrup/cord of wood. Forty five producers had preheaters.

What do you wish you had done differently: Besides "tap earlier", several people mentioned fix, improve or add vacuum, and stop tapping buckets. Many people would like to have added taps. There is an effort by the Vermont Maple Sugar Makers' Association to get the department of Forests, Parks & Recreation to open up some state land for tapping. That might be one moderate solution to problem of more trees to tap.

There were many **suggestions for maple research**, and we appreciate all of them. Many people mentioned the effects of different r/o concentrations of syrup flavor. That is an ongoing project at PMRC, and you will be hearing results from those experiments later this year. Another frequently suggested topic was long term effects of high vacuum, as I mentioned above. Several people are concerned with the optimum taphole depth and optimum depth to drive spouts, as relates to sap yield, as well as the correct size bit for different spouts. Do adaptors work was a frequent topic, as well as the best way to maintain clean tubing. Other topics included the effectiveness of auto start for vacuum vs. leaving it on all the time; the use of a disposable straight spout vs. a disposable adaptor, spout color, average yield from trees of different diameters, and the optimum use of defoamer for organic producers. If I didn't mention your suggestion that doesn't mean it wasn't noted.

A few additional comments:

"I'd like to see a clear plastic spout made like the straight stainless spout that we can use one year and throw away."

Can you "prove scientifically that adaptors are worth the money?"

“In my opinion running water/air throughout the system as I did for many years actually makes for less clean poly tubing than by not washing at all. Besides, this is very time consuming. [By not washing] water does not sit in the droplines or laterals making great places for bacterial growth. I do pump water at various points into the mainline with the vacuum pump running. When pulling taps, I do run the vacuum pump to make sure that all liquid in the lines is sucked out. In the following spring, we find the usual first run somewhat cloudy (this was the case with washed tubing as well), but we filter our sap thru a 10 micron filter bag before it goes to the r/o.”

“Wished I had got the tubing washer last fall and used it last fall; I have the feeling some of my older lines may be plugged”

“I spent a lot of time pounding spouts in tighter.”

“I would much rather chase a few leaks at the spout than lose an entire season with reduced flow because I hit the tap too hard” [and it went too far into the hole].

“We would like to see some research that takes economics into account, i.e. if a sugarmaker has a good season and has \$10,000 to reinvest, what makes the most sense: add taps, more vacuum, r/o machine, redo existing tubing, thin orchard, some combination of all?”

“Too much snow in my woods—trees were in a refrigerator all season.”

“Last year I had plenty of complaints and I think it’s because it was such a crappy year down here [SE VT]—this year, with almost all new adaptors I could say that made the difference, but I don’t think that’s true—all my spouts, droplines and lines were mostly one year older but we had a terrific year—so I think the weather plays the most important part....everyone went gangbusters down here and if anyone denies it he’s a pessimist or a crank.....I will be 80 next year and this season caught up with me, but it was a helluva good one to finish on.”

More things you wish you had done differently:

Not “waited a week to boil in the end of the season junk, and it turned ropy and un-boilable in the pan.”

“Not sold last year’s syrup.”

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