

Ask Proctor

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Why are my tapholes leaking, and what can I do about it? (Part 2)

The previous article focused on one type of “leaking” taphole issue that maple producers commonly experience. This time I’ll focus on yet another question about “leaking” tapholes, which is the presence of small bubbles near the spout. Very often neither of these are actual leaks, but instead, are merely what are perceived by producers to be leaks.

This type of “leak” is indicated by the presence of very small bubbles as sap exits the taphole. Close to the tree the bubbles are tiny, but grow in size as they move out of the spout and into the dropline. One important characteristic is that these bubbles move fairly slowly, perhaps an inch every couple of seconds.

Rather than being leaks in the spout/tubing system, these small bubbles are actually gases coming out of the wood of the tree and are quite natural. Like most living things, trees respire as they utilize stored sugars as part of their normal metabolic processes. The gases produced during respiration result in emboli (bubbles) in the wood vessels. In order for transpiration to occur in the summer, these emboli must be eliminated from the tree’s plumbing system. Typically, in maple trees, this happens through the dissolution (dissolving) of bubbles back into solution during the buildup of pressure within

the stem in the spring. The higher pressure that is generated dissolves the gas bubbles back into the liquid, and the vessels are thus rendered functional again, and ready to supply leaves with water. However, if there are wounds in the stem, as pressure builds up, these gas bubbles can also escape along with the sap that is exuded.

Years ago, when buckets were used for sap collection, there really wasn’t much notice taken of this phenomenon. Although scientists have known for a long time of the gases produced by trees, many maple producers didn’t – there wasn’t any real need to think about it. Fast forward to present day, put tubing on the spout, and bubbles stand out. For maple producers using clear polycarbonate spouts and high vacuum, the bubbles are even more noticeable and it is often an obvious, but erroneous, conclusion that these gas bubbles are leaks.

So how do you tell if bubbles observed in spouts and tubing are from leaks or from tree gases? If you’re not on vacuum, it doesn’t matter a lot. As long as sap is not dripping outside the spout, it isn’t a leak you need to be greatly concerned about. For producers on vacuum, bubbles may either be natural tree gases, or a leak. The simplest way to tell the difference is to observe the speed and periodicity of bubbles. If bubbles are moving rapidly, and if there is a relatively unbroken “train” of bubbles (a series of small bubbles one immediately after another), then it is probably a leak. In that case, maple

producers should check for nicked tubing, a cracked spout, or another source of the leak. If the leak is very near the spout or coming out of the spout itself, sometimes a slight tap on the spout to ensure that it is properly seated in the taphole will solve the problem. It is certainly possible for spouts to heave due to extreme freezes.

If bubbles are very small when first coming out of the taphole, but grow larger as the transit the spout, and they only move relatively slowly in the stream of sap, then are likely due to tree gas. In this case, the best course of action is to do nothing. Hitting the spout harder to seat it won't stop the gases, but may create microleaks between the spout and the taphole – which will only create a problem that can't be fixed, if you make it worse by hitting the spout harder and harder in an attempt to stop it.

Normal gas bubble exudation is shown at <https://goo.gl/9M2wQA> (video courtesy of Mark Isselhardt, UVM Maple Extension).

Tree gas production will also be much more copious on warm days. This is often why producers on vacuum will see a slight vacuum drop in their tubing systems during a warm spell. As more tree gases are produced, it must be moved out of the tubing system to maintain the same vacuum level.

The overall aim of this and the preceding article is for producers to gain a better understanding of some common issues that at first glance appear to be problems but, in reality, are not. Being able to recognize what is really a leak takes some time and thought and experience, but in the long run, knowing the difference and how and when to act will help producers achieve higher sap yields.



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