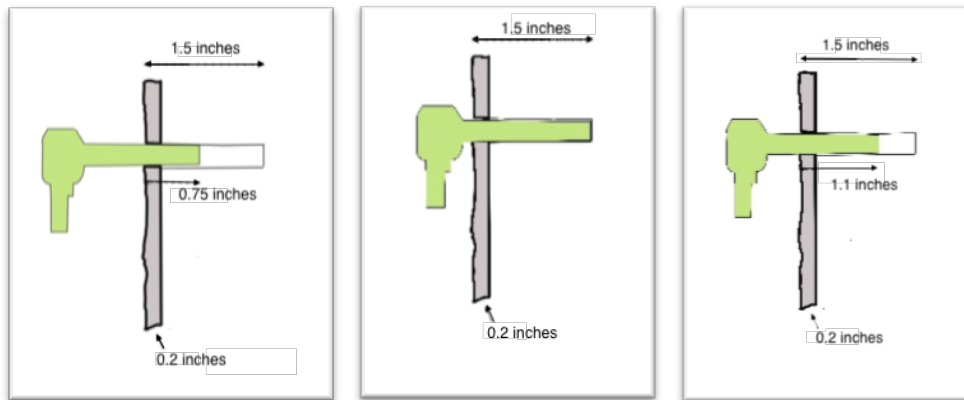




TAPPING DEPTH & SAP QUANTITY

2019



Conducted in partnership with the West Virginia Department of Agriculture

by Mike Rechlin



BACKGROUND

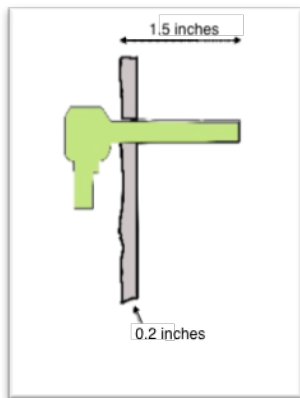
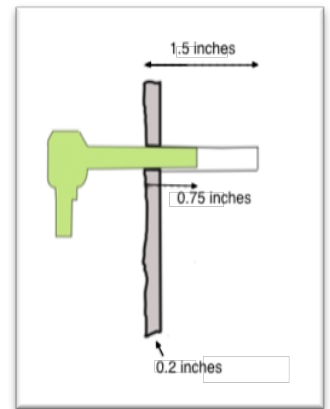
Accepted tapping practices for 7/16 inch spouts with no vacuum called for tap holes to be drilled 2-2.5 inches deep. Later practices for 5/16 inch spouts under vacuum, call for drilling the tree to a depth of 1.5 inches. The reason for the reduction in depth, was to reduce the occurrence of drilling into dead wood, especially on trees with a long history of tapping. This can lead to reduced sap yield.

When the 2018 season left us with an unusually low sap yield, the question arose: does tap depth matter when the system is under vacuum?

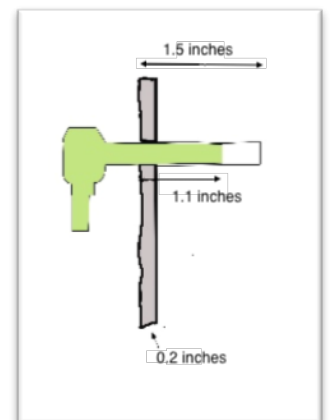
A QUICK STUDY

This question arose late in the 2018 sugaring season. The first week of April, which would normally be past the sap flow season in Franklin, West Virginia, brought an unusual series of freeze/thaw events that caused the sap to flow again. Taking advantage of this, four sugar maple trees were tapped, producing some really “buddy” sap.

Each tree was drilled twice: one on each opposite side to the standard 1.5 inches. One hole in each tree had a spout tapped in just until it stuck—to the point where the sound pitch of the last tap on the spout increased and the tapping hammer bounced back off the spout. This spout was properly tapped. As seen in Figure 1, the properly tapped spout “stuck” when it was an average of 0.75 inches deep in the 1.5-inch hole.



Two trees had the spout in the second hole driven in all the way to the end of the hole (figure 2), burying the spout barrel to the shoulder: 1.5 inches deep in a 1.5-inch tap hole.



The final 2 trees had the second spout driven in to a median point, 1.1 inches into the hole (Figure 3).

The properly driven spouts yielded 6.7 gallons of sap over 4 runs. The half-way driven spouts yielded 3.0 gallons and the spout driven in all the way only yielded 2.7 gallons of sap.

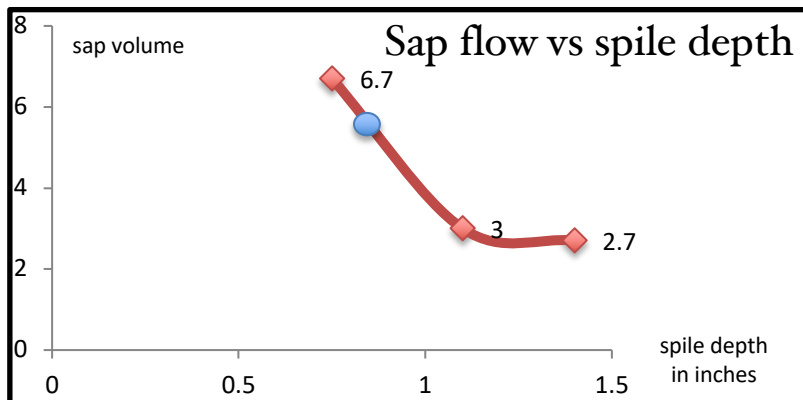
Figure 4. TAPPING DEPTH AND SAP YIELD

Tapping depth (inches)	Sap yield (gallons)	Percent reduction
0.75	6.7	0%
1.1	3.0	55%
1.5	2.7	59%

This shows the importance of properly setting spouts. Driving them in too far reduces the exposed vascular tissue from which sap can be drawn. A spout driven all the way into the hole only has the end of spout tissue available for sap flow, yielding, in this study, a 60% reduction in flow. What

is interesting is that this study showed that driving the spout in to the medial point also greatly reduced sap yield.

It is not likely that many maple syrup producers drive their taps into the tree all the way. However, when tapping, there is the temptation to give them all one more hit after the tone increases just to make sure they don't leak. After the season was over, I tapped one more tree and properly seated the spout to 0.75 inches. I then gave it one more hit "just to be sure," driving the spout in to 0.85 inches. Interpolation from the graph of the data from this study shows that that extra tap reduced sap flow to 5.4 gallons. Which leave us with the question; is it worth a 20% reduction of sap flow, "just to be sure"?



Note: this was a one-year study with a limited number of trees. To be more than an indication of the importance of tapping properly it should be repeated with more replications of each treatment.

With support from:

The West Virginia Department of Agriculture through a Specialty Crop Block Grant
 Future Generations University

“This publication was supported by the U.S. Department of Agriculture’s (USDA) Agricultural Marketing Service through grant 16-SCBGP-WV-002. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the USDA.”