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COLLECTING MAPLE SAP WITH UNVENTED SPOUTS, USING AERIAL AND GROUND LINES

Abstract.—Two methods of using plastic tubing to collect sugar maple sap were tried: aerial lines and ground lines. Unvented spouts were used in both. We found that the sap yields collected from the aerial and ground lines were not statistically different from each other.

Plastic tubing used to collect sap from sugar maple trees (*Acer saccharum* Marsh.) is hung in two ways: in the air (aerial line) or on the ground (ground line). Two types of spouts are used with these lines—vented or unvented. Because there are a number of ways to install tubing, and because every sugaring operation is different, it is difficult to recommend a tubing method that can be successful for all sugar producers. Some sugar producers have had problems getting tubing to work.

Since 1966 our sugar maple sap project at Burlington, Vermont, has done a series of studies on methods of hanging tubing and methods of spout venting. In 1969 we compared yields collected from aerial lines and ground lines, both with unvented spouts. The study results indicated that either plastic tubing method works well when unvented spouts are used.

The Study

300 sugar maple trees, on a 10- to 15-percent southern slope, were separated into 15 groups of 20 trees each. Two tapholes were drilled into each tree to a wood depth of 3 inches. The two tapholes were approximately 6 inches apart. We assigned one taphole to an aerial line and the other taphole to a ground line.

On the aerial line we used an 18-inch dropline, and on the ground line we used a 4-foot dropline (fig. 1). Both lines were unvented. All

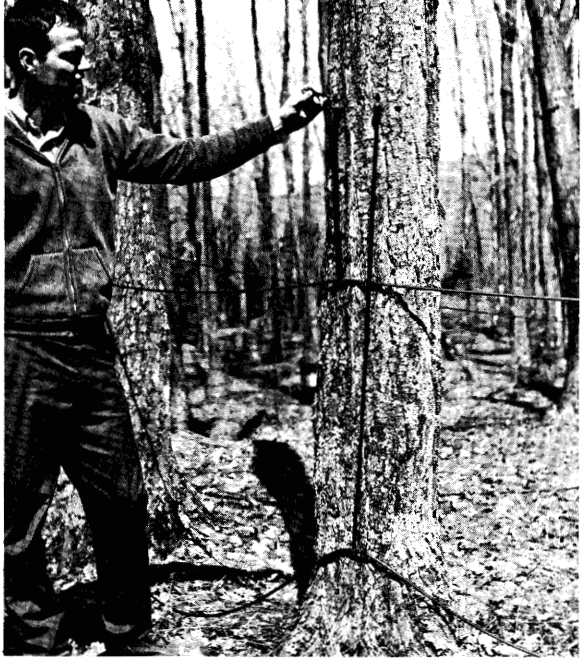

Figure 1. — Comparison of ground line (below) and aerial line (above) plastic tubing methods for collecting sap yields.

the unvented aerial droplines were hooked to one line for each 20-taphole group, and the yields from this line were then collected in a 55-gallon drum. The same was done for the ground line installation. Thus we had a total of 15 aerial lines and 15 ground lines, and the yields were collected from each line.

Sap yields were measured periodically to the nearest 0.25 liter, beginning 1 March and continuing to mid-April. We also measured vacuum at the upper end of each tubing line, using a vacuum gage graduated in millimeters of mercury (fig. 2).

Figure 2. — Measuring vacuum with a gage graduated in millimeters of mercury.

Results

We collected approximately 11.7 percent more sap from the aerial line than from the ground line (table 1). However, this difference was not statistically significant at the 5-percent level of testing.

Table 1. — *Summary of sap yields from two unvented tubing installations*

Replication number	Sap yields	
	Aerial line	Ground line
	Liters	*Liters*
1	420.0	469.0
2	460.0	824.0
3	768.0	489.5
4	728.0	493.0
5	603.5	597.5
6	606.0	342.5
7	468.0	360.0
8	415.0	492.0
9	648.0	620.0
10	560.0	375.0
11	421.0	545.5
12	426.5	395.5
13	539.0	376.5
14	630.0	491.5
15	594.0	549.0
Average	552.5	494.7

In previous work we found that unvented aerial lines hung on a 10- to 15-percent slope develop a natural vacuum. This natural vacuum was largely responsible for the collection of more sap yields through unvented lines. In this study, we measured good natural vacuums in both the aerial lines and ground lines. Some of our vacuum measurements reached as high as 350 to 400 millimeters of mercury.

Summary

The results of this study indicate that it makes little difference whether a producer uses an aerial line or a ground line tubing method when the lines are *unvented*. In a previous study, we found that if a producer prefers to use only *vented* spouts, he could also use either a

ground line or aerial line tubing installation.[1] However, where the topography is sloped, we suggest using *unvented* spouts to gain the advantage of increased yields resulting from natural vacuum.

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[1] Smith, H. Clay. USE EITHER AERIAL LINE OR GROUND LINE TUBING WITH VENTED SPOUTS. Natl. Maple Syrup Dig. 8: 6-7, 1969.

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