# Performance of the small diameter spout (19/64”) for maple sap production

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In response to the interest exhibited by maple producers in the recent development of a smaller diameter spout by the maple equipment industry, a study was initiated in 1999 at the Uihlein Sugar Maple Field Station of Cornell University at Lake Placid, New York. The new 19/64”spout, with a smaller diameter than that of the traditional 7/16” spout used for maple sap production, reduces taphole size and can potentially increase the rate of taphole closure while decreasing the amount of taphole discoloration zone within the tree.


This study examines the differences in sap volume yield, sap sugar concentration, rate of taphole closure, and amount of discoloration zone between sugar maples tapped with small and traditional spouts. The study design consisted of 8 replicated lines of 10 taps (80 taps), each installed within the field station sugarbush and high vacuum sap collection system. The lines were installed in a manner to allow the use of vacuum vessels for collection and measurement of sap volume and sap sugar concentration on a daily basis. Vacuum levels were maintained at 15 to 18 inches Hg at the tap throughout the duration of the study. To reduce the effects of tree variation, trees that were tapped with small diameter spouts in 1999 were then tapped with large diameter spouts in 2000, and vice versa.

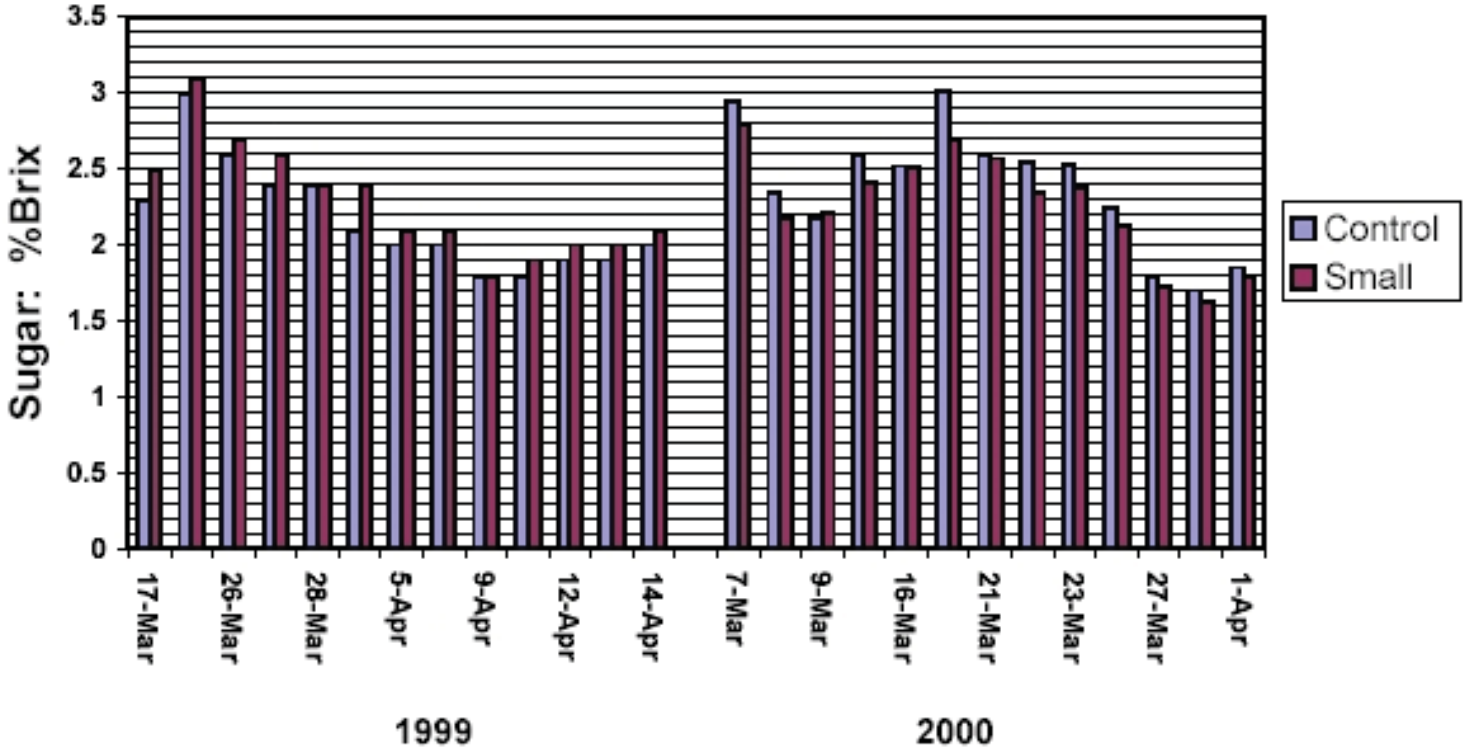
### *Results*

Overall results of the two-year study suggest sap volume yield from small diameter spouts in high vacuum sap collection systems is comparable to that of conventional spouts with no significant difference in sap sugar concentration. Taphole closure rates, monitored for two (2000 treatment) or three (1999 treatment) years were significantly faster in trees that were tapped with a small diameter spout.

Following final taphole measurements, and after trees entered dormancy in early October 2001, six trees were felled to examine discoloration zones. In each tree, the zone of discoloration surrounding the small spout taphole was smaller (length, width, and depth) than large spout tapholes. The average discoloration zone area was 23.28 sq. inches for the large spout and 11.36 sq. inches for the small spout. Note that while the small spout (19/64”) is about 70% as big as the large spout, the area of small spout damage is about 50% of that of the large spout; that is, the reduction in damage is proportionally greater than the reduction in spout size. A further detailed study and quantification of the discoloration zone will be continued this winter and after the next growing season.

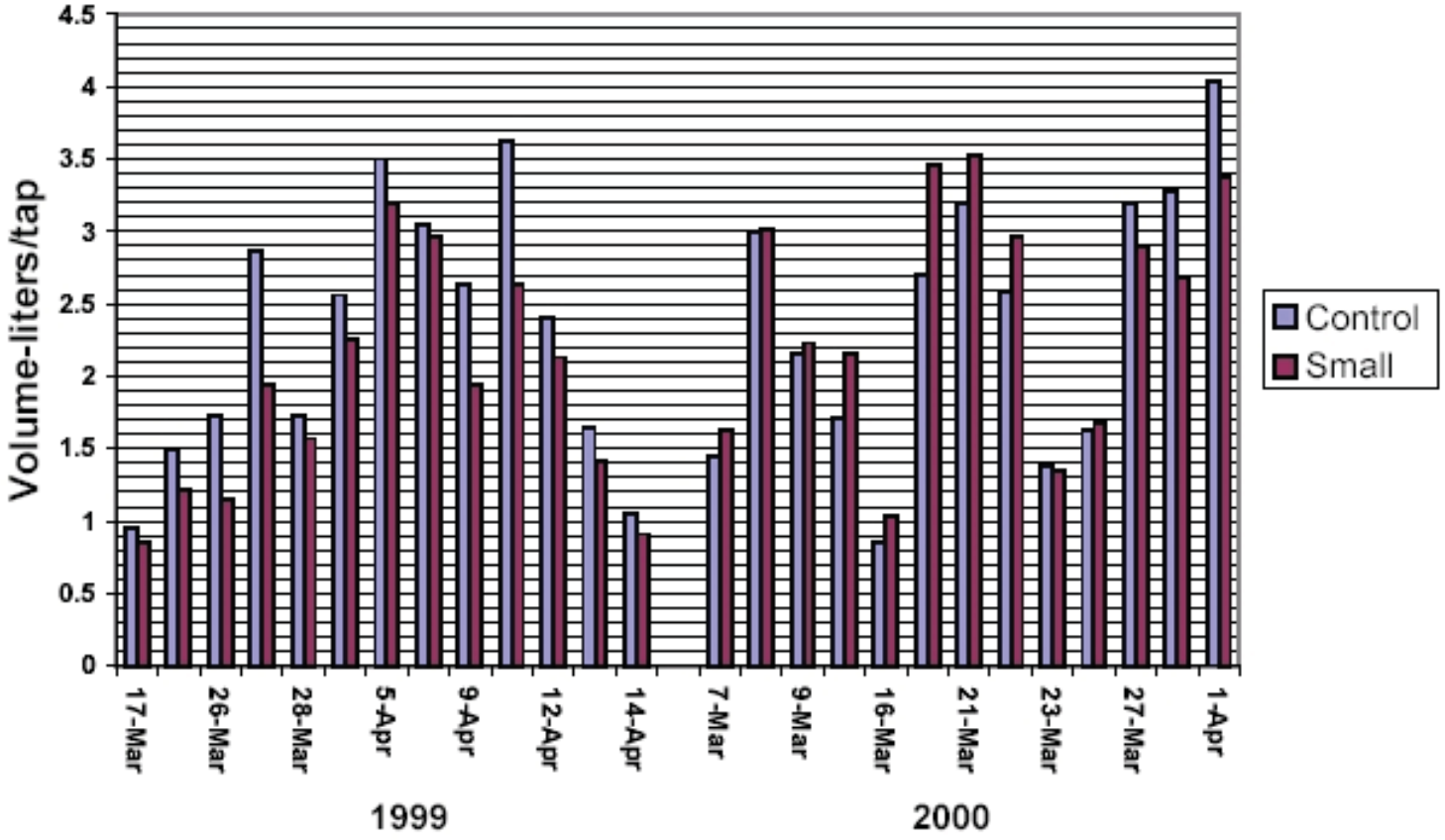
## Small Spout vs. Conventional Spout Study

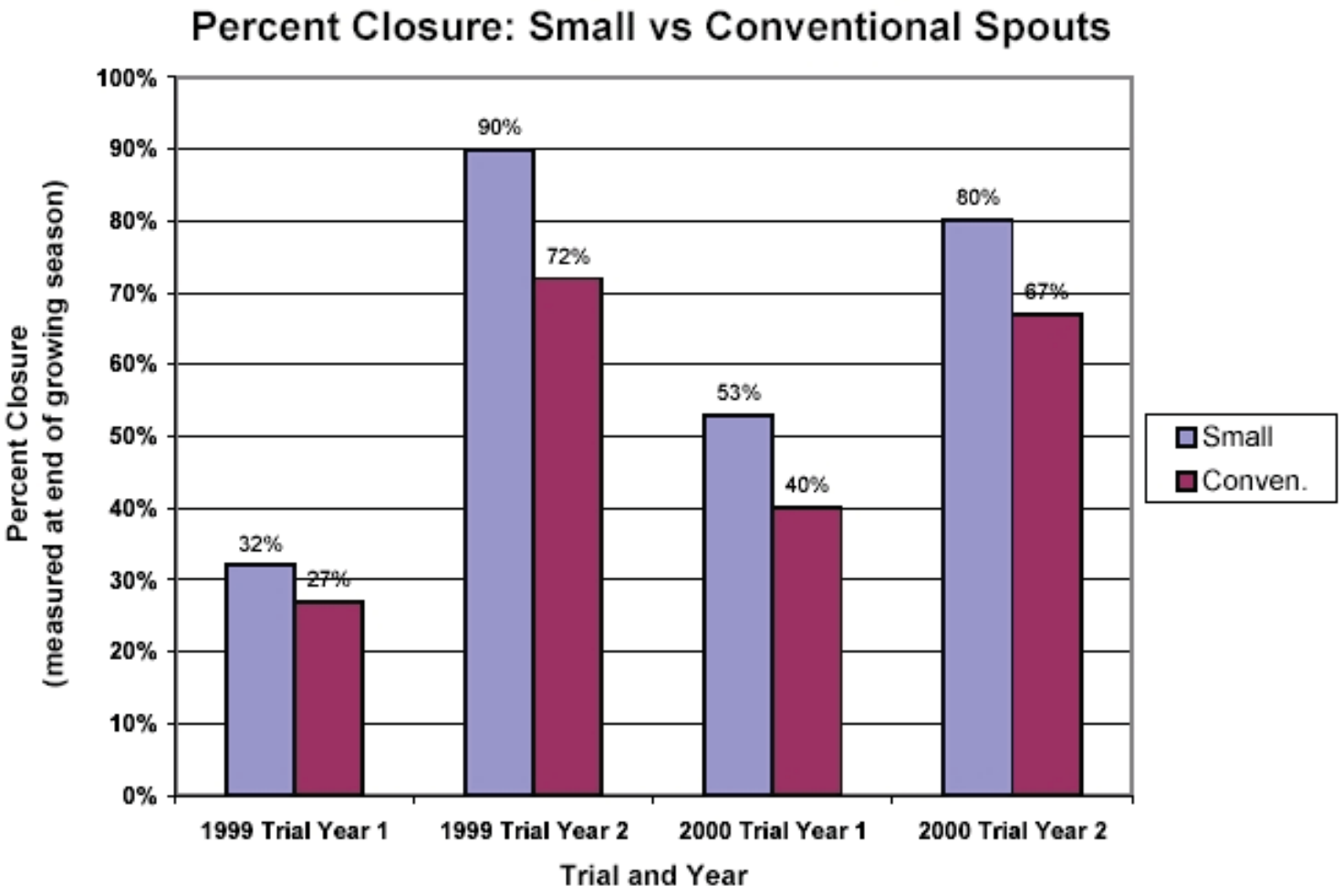
Average Sap Sugar Concentration(%Brix) by Flow Date




## Small Spout vs. Conventional Spout Study

Average Volume (L/tap) by Flow Date






Taphole closure rate. Trees were tapped in 1999 (Treatment 1) and 2000 (Treatment 2), and tapholes were measured at the end of each growing season for both treatments. A completely closed taphole would measure 100%, and a wide open taphole would measure 0%. Small tapholes had closed more completely than large tapholes at the end of each growing season.

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