

# THE MAPLE NEWS



## **2018 Cornell Maple Program tests using 3/16" tubing.**

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Each year the Cornell Maple Program conducts trials where each treatment is replicated 4 times under vacuum. Each replication is made up of one lateral line with four taps. Each of these lateral lines is connected to a 12" x 36" canister which collects the sap from that one lateral line so that the yield of sap from each replication can be measured in gallons of sap per tap. Each day sap runs the sap in the canisters is measured, then vacuumed into the mainline and sent to the sugarhouse for processing. Each time the canister sap is released into the mainline the vacuum to the lateral line is interrupted, causing some back flow in the lateral line and spout making these a fairly severe test of the system's ability for keeping the taphole sanitary. This may explain why some treatments do better in the field sized demonstrations than they do in the replicated trials. In 2018 there were 13 different treatments in the replicated trials. Of the 13, 7 were testing with 3/16" lateral tubing and 6 were testing 5/16" lateral tubing systems. Two of the tests with 3/16" laterals were testing with 5/16" drops. All the treatments and replications had 10 feet of elevation drop or less and ranged from 75 to 125 feet long.

The table below reflects the total sap yield per tap as the first number followed by the percentage increase compared to the second year in use system which was the lowest yielder of the 7 treatments.

The first treatment listed at the top of the table is a completely new 3/16" tubing system, new laterals, drops and spouts. This treatment averaged 35.4 gallons of sap per tap.

The second treatment from the top on the chart was all new in 2017. A new Leader stubby for 3/16 and clear check valve adapter were installed for 2018. These had been vacuumed dry at the end of the 2017 season and the stubby and spouts replaced at tapping time. This treatment yielded 20.8 gallons of sap per tap.

The third treatment from the top of the chart was all new in 2016, used in 2017 and had a new 5/16" drop and new spout added just before tapping in 2018. This treatment averaged 26.4 gallons of sap per tap.

The fourth treatment from the top of the chart was all new in 2016, used in 2017 and had a new 5/16" drop and bac zap or silver spout added just before tapping in 2018. This treatment averaged 28.7 gallons of sap per tap.

The fifth treatment from the top of the chart was all new in 2017. In 2018 new spouts were added and two in line check valves from usplastics, one next to the mainline and a second in the middle of the lateral line. This treatment averaged 22.6 gallons of sap per tap.

The sixth treatment from the top of the chart was all new in 2017. . In 2018 new spouts were added and one in line check valves from usplastics, one next to the mainline. This treatment averaged 26.1 gallons of sap per tap.

The seventh treatment from the top of the chart was all new in 2017. Nothing was changed for the 2018 season. This treatment averaged 19.2 gallons of sap per tap.

It is clear from this series of tests that making no improvements to a 3/16" tubing system gave the poorest results follow closely by the treatment with new check valve spouts. The third poorest yielding treatment was where two in line usplastics check valves were used in the lateral line. It seems having two of these check valves in the line restricts flow reducing yield. Adding a new spout and either a new 5/16" drop or adding one usplastics check valve at the mainline end of the lateral line increased yield in previously used 3/16 by about 6 gallons of sap per tap or about 36% yield increase. Adding a 5/16" drop and a bac zap silver spout increased yield by 9.5 gallons of sap per tap or about 49% yield increase.

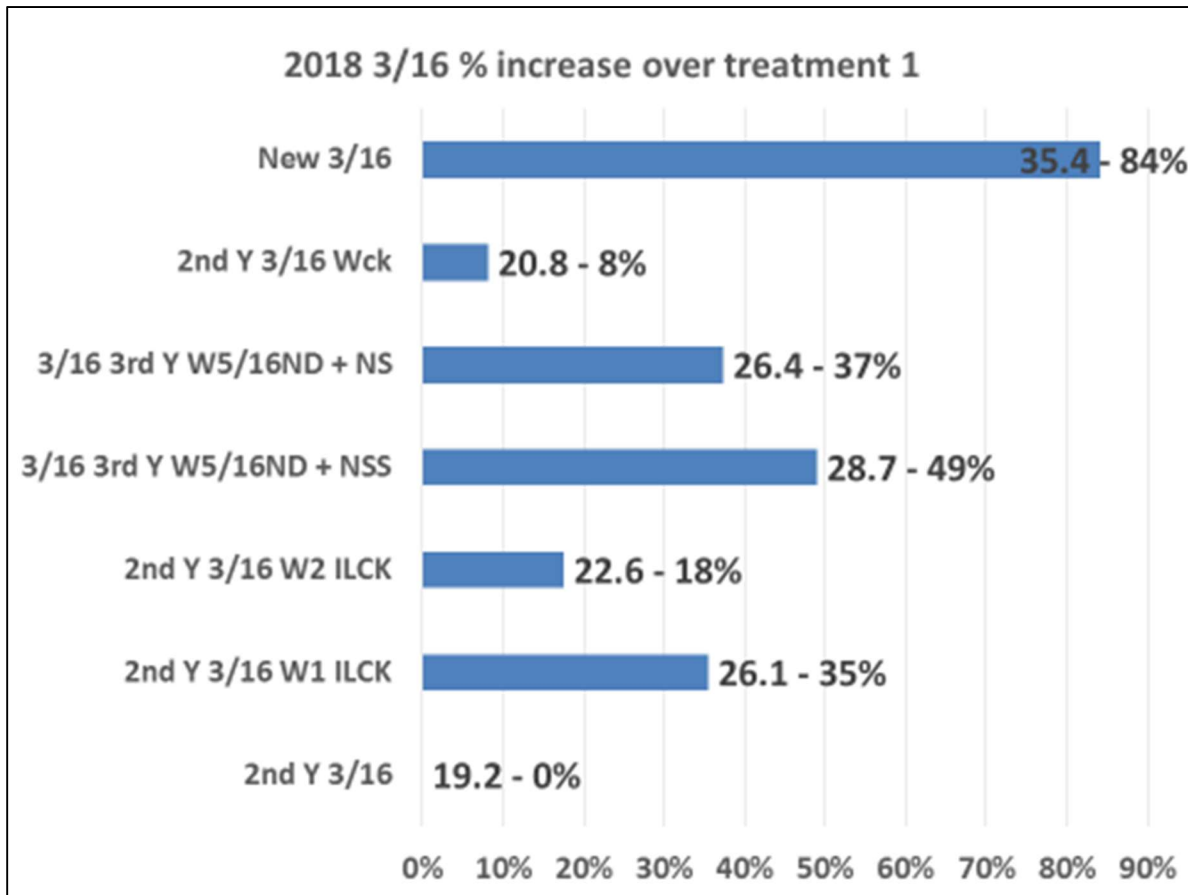
There were three demonstration trials set up at the Arnot Forest where 3/16" tubing were observed. Here we don't have a way of measuring sap flow but can see the relative rate of flow in the lines and when flow comes to a stop.

The first demonstration was on about 1000 taps that were installed in 2016 and used in the 2017 sap season. These had been vacuumed dry at the end of the 2017 season. A new Leader stubby for 3/16 and clear check valve adapter were installed for 2018 at tapping time, the third week of January. This demonstration stopped yielding sap the last week of March.

The second demonstration was on about 400 taps that were installed in 2016 and used in the 2017 sap season. These had been vacuumed dry at the end of the 2017 season. Here the lateral lines averaged about 700 feet in length with an average of 24 taps and about 100' of elevation fall. Here new spouts were installed at tapping time for the 2018 season, the third week of January. Most of these lines were still running when spouts were pulled the last week of April. Lines that had been compromised by squirrel damaged had stopped running by the last week of April. It would appear that where the vacuum pull from the combination of mechanical vacuum and the gravity pull vacuum the vacuum developed by the tree during freezing cannot win the sap pull contest to pull sap into the taphole from the tubing, contaminating the taphole.

The third demonstration was on over 1000 taps that were installed in 2016 and used in the 2017 sap season. These had been vacuumed dry at the end of the 2017 season. A new 5/16" drop line and new bac zap silver spout were installed for 2018 at tapping time, the third week of January. These lines were still running at a good pace when spouts were pulled the first week of May. The silver spouts should be the most effective when sap passes through them slowly. The silver spouts in the demonstration continued to run longer than those in the replicated trial where they had pretty well stopped significant flow by April 10<sup>th</sup>. This is likely due to the 17 times during the sap flow season that the sap collection canisters had the vacuum released to allow the sap to go into the mainline system after being measured.

This research gives a number of hints about ways to keep 3/16" tubing producing at a high level year after year and creates many more questions about what tests need to be run in the 2019 maple sap season.



Picture of an inline 3/16" check valve (ILCK)





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