

THE MAPLE NEWS



Taphole sanitation results over time with 5/16" tubing

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When testing maple spouts, droplines and sanitation options results can vary significantly from year to year. In light of that variation, tests that look promising are run for a number of years to see if results are consistent over time. The following tables show the results of some of the tests that have shown promise for increasing yields in 5/16" tubing. Experiments that were run in 2006 indicated that installing a clean spout and clean drop could have significant effect on sap yield. The 2006 data combined with a simple knowledge that maple trees often pull sap back into a taphole when the tree freezes and that spouts and drops can carry a high bacteria and yeast load led to the years of experiments listed in the tables below. The simplest test was to simply replace the spout so that the taphole was not inoculated by simply driving the old contaminated spout into the taphole. That test was conducted in 2007 and showed that simply replacing or sanitizing the spout would increase yield by 15 to 20%. But when the spout replacement was accompanied by a new drop the yield increase was 100%. Thereafter just replacing the spout was no longer studied by itself but always in combination with keeping the dropline from contributing to sap yield loss.

Replacing the spout and drop tests started with cooperator Ed Haag in 2007 and have continued through the 2018 season. It is now used in all of our replicated trials as a standard to compare many other treatment options.

Record of new spout and drop vs. old spout and drop

Gravity

- 2007 – Haag field study 100% increase
- 2008 – Arnot 100% inc.
- 2009 – Arnot 160% inc.
- 2010 – Arnot 76% inc.
- 2011 – Arnot 133% inc.
- 2012 – Arnot 42% inc.
- 2013 – Arnot 87% inc.

Vacuum

- 2009 – Breezie Maple field study 110% increase
- 2010 – Arnot 151% inc.
- 2011 – Arnot 120% inc.
- 2012 – Arnot 25% inc.
- 2013 – Arnot 114% inc.
- 2014 - Arnot 106% inc.
- 2015 - Arnot 94% inc.
- 2016 – Arnot 29% inc
- 2017 – Arnot 57% inc
- 2018 – Arnot 79% increase

Average with vac 77% increase or 12.6 more gallons of sap per tap

The history of tests clearly shows on average that over 12 years new spouts and drops out perform old spouts and drops by 77% resulting in 12.6 more gallons of sap per tap. In each test the old spouts were at least two years old and old drops 6 years old.

The next option that was tested was the check valve spout. Check valve spouts were more convenient as only the spout needed changing rather than the spout and the drop. Yield results were fairly similar over time.

History of Check Valve Tests

- **Vacuum**
- **2010 114% increase**
- **2011 101%**
- **2012 20%**
- **2013 58%**
- **2014 106%**
- **2015 83%**
- **2016 19%**
- **Gravity**
- **2013 33% increase**
- **2012 18%**
- **2011 77%**
- **2010 47%**
- **2009 43%**

Average with vac 71.6% increase or 12.1 more gallons of sap per tap

Over the testing years the taps with check valve spouts yielded 71.6% more sap than an old spout and drop resulting in 12.1 more gallons of sap per tap. Again in each test the old spouts were at least two years old and drops 6 years old and the drop on the check valve was at least 6 years in use.

In 2013 the first test was run where old spouts and drops were sanitized with a bleach solution. Plastics can be difficult to sanitize so a longer than previously tested contact time of 30 minutes was chosen for testing. So spouts and drops were removed from the sugarbush which was made convenient by locating a quick connect fitting about 3 inches from the lateral line. Leaving the male end of the quick connect fitting on the lateral line side allowed a cap to be placed on the stub of a lateral left to keep insects out and allow for other cleaning options for the lateral line. The spouts and drops were brought to the sugarhouse, rinsed with water, submersed in a 200 ppm bleach solution for at least 30 minutes, rinsed, dried and stored until going back on the tubing system just prior to tapping. Yield results were then compared to other treatments, in particular with new spouts and drops and with old spouts and drops.

History of Bleaching Tests

- **2013 Gravity 95% increase =new**
- **2014 Vacuum 101% increase 1%>new**
- **2015 Vacuum 96% increase 1%>new**
- **2016 Vacuum 34% increase 5%>new**
- **2017 Vacuum 57% increase 1%<new**
- **2018 Vacuum 78% increase 1%>new**

Average 76.6% increase or 16.4 more gallons of sap per tap

After six years of testing the bleached spouts and drops average 76.6% increase in sap yield or 16.4 more gallons of sap per tap than old spouts and drops and yield very close to new spouts and drops. This system takes more labor than check valves and more labor than making and installing new spouts and drops but with lower cost of materials as the same spout and drop can be used for many years.

Sanitizing with food grade peroxide also works but has not shown the same sap yield potential that is seen with sanitizing with bleach.

History of Peroxide

- **2014 Vacuum 76% increase 16%<new**
- **2015 Vacuum 24% increase 23.5%<new**
- **2016 Vacuum 42.9% increase 9.5%<new**
- **2017 Vacuum 19% increase 24.9%<new**

- **Average 21.5% increase 18.5%<new**

Average 21.5% increase or 5.1 more gallons of sap per tap

A variety of other treatments have been testing using 5/16" tubing including boiling the spouts and drops, baking the spouts and drops, sanitizing with alcohol, just washing with just water, silver lined drop lines, copper spouts and tests on the bac-zap silver spouts. Most of these either showed little promise, caused other problems to spouts or drops or were tested in ways that did not give the long history we are comparing in this article. The bac-zap spouts were tested for 5 consecutive years where no additional sanitary practice was used. At the end of the season they were simply pulled from the taphole and place in the holder and when tapping just pulled from the holder and placed into the taphole. They were installed on an old drop from the beginning. They increase yield by between 80 and 129% in the first year over old spouts and drops and continued to benefit yield by 25% in the fifth year. Many more tests have been completed on 3/16" tubing and that will be covered in the next article.



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