Today’s Outline

• Historical context of sugaring today
• 15 Reasons why everyone should consider sugaring
• Ten questions to ask yourself
• Sugaring Basics
• Educational resources
Elderberry & Sumac Spouts
"I have never seen a reason why every farmer should not have a sugar orchard, as well as an apple orchard."

- Thomas Jefferson 1791
15 Reasons Why Every Farm Should Consider Sugaring
#1 Sugaring connects us with our historical roots
# 2 Technological advancements have made sugaring *relatively* easy
#3 Sugaring brings people together around a common, worthwhile goal
#4 Syrup produced from tree sap is one of the healthiest sweeteners
#5 Maple sap is the best drink in the world
# 6 Pure maple syrup tastes much better than artificial ‘pancake syrups’
#7 You can take pride and satisfaction in producing your own sweetener
# 8 There is a growing demand for pure maple and current consumption is VERY low!
#9 Tapping provides an economic incentive to conserve trees and forestland
# 10 Sugaring can be a profitable enterprise
...especially when you produce or sell value-added maple products
There is a vast resource of untapped maple trees.
...and we are barely tapping any of them!

FIGURE 4.4. Source: USDA Forest Service FIA data and NASS report from 2011.
# 12 You can even tap walnut trees
….and birch trees!
....and even sycamore trees!
#13 Sugaring gets kids outside and active after school
#14 Sugaring can be energy efficient

Solarsweet Sugarhouse in Vermont
…especially when it is done on a large scale
#15 in New York and Wisconsin, there are large tax breaks for using woodland for sugaring
Questions to Ask Yourself

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• What are the local markets for pure maple products?
<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Dense sugarbush with many healthy trees</td>
<td>• Very limited time to devote to sugaring</td>
</tr>
<tr>
<td>• Good slope and access</td>
<td>• Local markets are already saturated with syrup</td>
</tr>
<tr>
<td>• Can repurpose old barn for sugarhouse</td>
<td>• Power is far away from sugarbush and old barn</td>
</tr>
<tr>
<td>• Many family members and friends want to help</td>
<td>• Don’t have any previous experience</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Growing demand for pure maple syrup</td>
<td>• Pest or disease outbreak could kill trees</td>
</tr>
<tr>
<td>• Technological advances are making sugaring less time consuming</td>
<td>• Unpredictable weather patterns could impact sap yields</td>
</tr>
<tr>
<td>• Many landowners looking to lease trees for tapping</td>
<td>• Oversupply of syrup could reduce prices and increase market competition</td>
</tr>
</tbody>
</table>
Sugar Maple - *Acer Saccharum*
Black Maple- *Acer Nigrum*
Red Maple - Acer Rubrum
Silver Maple
Acer saccharinum
Norway Maple
*Acer Platanoides*
Practice sound sugarbush management

Benefits

– Improved tree health
– Improved sap sugar concentrations
– Increased sap quantity
– More resilient trees
– Easier to comply with tapping guidelines
When To Tap???

• Calendar
• Climatic Data
• Personal Journal
• Test taps for sap sugar content
• Weather – 5/10 day forecast
• Your schedule and availability
Tapping Practices

• $1 \frac{3}{4}$ inches to $2 \frac{1}{2}$ inches deep
• *Slight* upward angle OR straight in
• Clean sharp bit
• Convenient height
• Hammer the spout lightly into the tree
Hammering too hard on taps can cause leakage, especially when the wood is frozen and you use tapered spouts.
Number of taps should be a function of:

- Usable circumference
- Tree growth rate
- Tap hole depth (1 ¼ to 2 ½ inches)
- Tap hole diameter (5/16 vs 7/16)
Tapping Guidelines

Source of tapping guidelines?

Collingwood et al 1928: 10, 12, 20
Murphey 1937: 10, 12, 14
“Traditional” (1935): 10, 15, 20, 25
“Conservative” (1987): 10, 18
Avoid the Oval Taphole

- Leakage
- Microorganisms

- Sharp Bit
- Slow Down
The Tap Hole Should Be Cut

• Not burned
• Scored
• Smashed
• Ripped
• Or Bashed
Dark Shaving = Yellow Sap

Yellow Sap = Dark Syrup, Off Flavors
Move Taps Up And Down As Well As Around
One possible pattern.......
Collecting with Buckets

- Often – Daily
- Exclude rain or tree drip
- Use Food Quality Containers
- Clean Up Between Runs
- Dump Yellow Sap
- Filter or Strain Sap Before Boiling
Tubing System Concepts

- Use gravity to your advantage
  - tight, straight, downhill
- Keep it simple and direct
  - minimize fittings, standardize when possible
- Must be inspected and maintained
  - no tolerance for vacuum leaks
  - replace every 10-15 years
- Proper cleaning is essential
There are lots of fittings out there.

Check around to see what you like before putting in a new system!
Making Syrup

How much sap will I get?
7 to 25 gallons per tap
Average 11

How much syrup will I make?
1 pint to ½ gallon per tap
Average 1 quart
Sap Processing Rules

• Process Sap ASAP
• Keep Sap Cool, Out of the Sun
• Don’t Concentrate Off Flavors
  – Spoiled Sap
  – Cleaners
  – De-foamers
  – You Can Imagine (Smoke, Mildew, Insects etc)
Batch
Continuous Flow
De-foaming

- Oil or Fat
- Use often and as little as possible
- Can Add Off Flavors
What Fuel to Use?
<table>
<thead>
<tr>
<th>Fuel</th>
<th>Cost per million BTU's</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wood</td>
<td>$6.96</td>
</tr>
<tr>
<td>Coal</td>
<td>$7.50</td>
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<tr>
<td>Fuel oil</td>
<td>$16.67</td>
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<tr>
<td>Natural Gas</td>
<td>$14.40</td>
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<tr>
<td>LP Gas</td>
<td>$22.58</td>
</tr>
<tr>
<td>Electricity</td>
<td>$35.17</td>
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</tbody>
</table>
## Cost Per Gallon

Open Pan Evaporator with Preheat

<table>
<thead>
<tr>
<th>Source</th>
<th>Cost Per Gallon</th>
</tr>
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<tbody>
<tr>
<td>Wood</td>
<td>$5.97</td>
</tr>
<tr>
<td>Wood/air tight arch</td>
<td>$3.67</td>
</tr>
<tr>
<td>Coal/air tight arch</td>
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</tr>
<tr>
<td>Fuel Oil</td>
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</tr>
<tr>
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<td>$6.59</td>
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<tr>
<td>LP Gas</td>
<td>$10.33</td>
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*At Standard Furnace Efficiency!*
When Is It Syrup?
Sugar Content 66%

Can be determined with:
Thermometer
Hydrometer
Refractometer
66% Sugar
7.1 Degrees F
Above Boiling of Water
1º F error

63.4-68.3
63.4=mold
68.3=crystals
Adjust for Temperature

66.9 ° Brix or % sugar at 60° F Vermont
59° Brix at 209+° F
Conclusions concerning testing the density of finished syrup:

1. Know the calibrated reading temperature of your hydrometer and calculate adjustments

2. Always base temperature adjustments on the present boiling point of water
Syrup Should Be Filtered
Available Resources

• each state has a maple producer association

• Cornell Maple Program, UVM Proctor Maple Research

• Maple equipment suppliers open houses

www.mapletrader.com

www.sugarbush.info

• The Maple News & Maple Digest