

# Maple Syrup

1. No one knows who discovered how to make syrup and sugar from the sap of maple trees
2. Well established among the Indians before white man came to America.
3. One of the oldest agricultural commodities.
4. One of the few crops that is solely American (Canadian too).
5. Maple syrup is a woodland crop
  - Maple trees grow best at altitudes of 600+ feet
  - Maple syrup is produced in hilly country
  - Maine to Minnesota and as far south as Indiana and W. Virginia
6. Has yearly fluctuation in production due to climatic and economic conditions
7. Maple season is short and comes in the early spring when most farm chores are minimal.
8. Maple syrup is non-cultivated, non fertilized crop from wood lots, providing supplemental cash incomes for many people
9. 35 - 40 gallons of sap are needed to make one gallon of syrup
10. A one acre lot will produce:
  - 160 taps
  - 10 - 15 gallons sap/tap
  - 1 quart of syrup/tap
  - 40 gallons of syrup/acre
11. Cost of producing syrup:

tubing/buckets	transportation costs to sugar shack
sugar shack	evaporator
fuel	packaging jugs
labor	land with maple trees/taxes
12. Syrup can be sold immediately or held for a more favorable market later in the year.  
Syrup must meet State and Federal Specifications.
13. Sugar Maples
  - Only 2 of the 13 species of maples native to the US are important in syrup production
  - Sugar Maple - 3/4 of all sap
  - Black Maple - more out west
  - Red Maple and Silver Maple - less sweet than

#### 14.The Sugar Grove:

Commonly called the sugar bush

Part of hardwood forests

Ideally non sugar trees are cut

Larger trees allow for reduced labor costs - more taps/tree

#### 15.Sap yields:

Based on number of taps and not trees

Yield per hole is independent of the number of taps/tree

Average range per tap is 5 - 15 gallons

Many trees can produce 40 - 80 gallons of sap/year

Sugar content of sap varies

Average tree has a sugar content of 2-3%

Many less than 1%

Some as high as 9%

Sap can run for as little as 24 hours to several weeks

#### 16.Tapping the Trees

Sap from trees for sugaring differs from the sap in the tree that circulates nutrients and water.

Sap will flow anytime after the leaves fall to well into the spring. Each time a period of below freezing weather is followed by a period of warm weather sap will flow, whether from a wound, cut or a tap.

Trees to tap should have a minimum diameter of 10” at 4 1/2’ above the ground.

#### 17.Rule of thumb for the number of taps/tree:

Diameter of tree in inches	Taps per tree
less than 10 “	0 taps
10 - 14”	1 tap
15 - 19”	2 taps
20 - 24”	3 taps
25 +	4 taps

Reducing the number of taps/tree decreases sap yields accordingly - no benefit to the tree

Over tapping may seriously damage tree

Measure and mark trees before season

#### 18.Boring Tap Holes

3/8” - 7/16” wood cutting bit - electric or battery or a hand brace

The hole is bored into the tree with a downward pitch of 5 degrees

3” deep (25% more sap than 2” deep)

The hole should be 2 - 3 feet above ground

Compass location of the hole is not important

6 - 8" away from last year hole, working up in a spiral pattern

Time required for new bark to grow over the tap hole depends upon the health and vigor of the tree

1 year is a good healthy tree

Longer for poor/stressed trees

A tap hole should be usable from the time it is bored until the buds begin to swell and the syrup acquires an unpalatable or buddy flavor.

Generally 3 - 4 weeks from boring

Microbial growth inhibits flow of sap

Sanitizing Tap Holes

Germicidal tap hole pellet inserted during time of boring to inhibit microbial growth

Now illegal -- known carcinogen

Can double/triple sap yields

Chlorinated tap holes helps if pellets are not used.

## 19. Spouts & Buckets

The spout has 3 functions:

- i. conveys the sap from the tap hole to a container
- ii. either connects to plastic tubing or serves as a support on which to hang the sap bucket
- iii. keeps adventitious (wild or stray) bacteria from gaining access to the moist tap hole.

Spouts were hollow reeds initially

- iv. Several types now
  1. plastic for plastic tubing
  2. metal for buckets
- v. Tapered to allow tight seal of tap to tree
  1. no leaky seams or loss of sap
  2. no splitting tree (leads to leaks)
  3. no damaging tree with hammer or loss of sap runs
- vi. Spout should be cleaned at the end of run and sterilized before use in the next year
- vii. Use rain guards to prevent bark debris entering bucket
- viii. Buckets are of 3 types
  1. Wooden
  2. Metal
  3. Plastic Bags
- ix. Buckets have lids to prevent debris entering sap
- x. Plastic bags have advantages
  1. light
  2. small storage space

3. self enclosed
  4. one hand operation
  5. sunlight kills some microbes -- sterile sap and good quality
- xi. Plastic bags have disadvantages
1. Too small for a days run
  2. breaking at seams
  3. not rodent proof
  4. difficult to wash out

## 20. Collecting Sap

by hand makes up 1/3 of cost to produce syrup

rotating buckets to show sap was collected

Sap must be collected every day to decrease spoilage

- i. can be labor intensive if small sap run
- ii. if one bucket is spoiled it will spoil all sap it comes in contact with  
sap is taken from buckets to collecting tanks.

## 21. Collecting Tanks

Are generally placed on a wagon pulled by a tractor, horse in older days

Driven around wood lots taken to evaporator

Larger the collecting tank means less trips to evaporator -- better efficiency

Plastic tubing requires no labor to pick up sap, only the initial laying out of the tubes at the beginning of the season. Some farmers leave the tubing out all year, this eliminates even more labor costs. Labor is required to check lines during the sugaring season to make sure lines are not broken by fallen limbs or rodents breaking lines.

## 22. Evaporator and its functions

The maple syrup evaporator is an open pan for boiling water from the sap

The primary purpose of the evaporator is to remove water

It must do it efficiently and in a way not to damage the quality of the syrup being made.

Very first evaporators were hollow logs in which hot stones were added.

Next, metal kettles used by white settlers (open wood fires)

Next, multiple metal kettles (3 - 4 kettles moving sap along to other kettles giving a lighter color and flavor)

Next, flat bottom pan and the enclosed fire box (increases fuel efficiency)

Next partitioned pans

Modern flue-type evaporators (reverse osmosis - removes 2/3 of water)

Changes in sap during its evaporation to syrup

- i. Color becomes darker
- ii. Sugar content increases
- iii. Flavor increases

### 23. Evaporation Time

Measured from the time a unit of sap enters the sap pan until it is removed from the syrup pan as syrup

Evaporation time can be increased by increasing the level of liquid in the pans

- too low of a level will allow sap to burn on the pan
- 1" liquid level is ideal.