CIDER MAKING FROM FRUIT TO SALE

- **Chris Negronida**
  - West Haven Organic Farm
  - Black Diamond Cider

- **Eric Shatt**
  - Redbyrd Orchard Cider

- **Steve Selin**
  - South Hill Cider
More than 400 Commercial Cideries in N-America, 2015
(www.oldtimecider.com/north-american-cider-map)
Apples for Craft Ciders

US Cider consumption doubling every two years

Bittersharps & bittersweets for hard cider at $20 to 40 per box, including some drops…

Aromatic sharps for sweet and hard cider blends

Dual purpose apples for both dessert & cider
The Cider Orchard

- Variety Selection
- Rootstock Selection
- Orchard Layout and Design
- Pest Control
- Ground Cover Management
- Terroir
Apples for Cider

Common - Plentiful table varieties

Heirloom – Antique, old varieties, generally Multi purpose.

Crossover – Good for cider and good as table fruit.

Hard cider Apples – Not for eating

  Bittersweets
  Bittersharps
  Sharps
Hard Cider Apples

- **SHARPS**: Tannins < 0.2%  TA > 0.45%
- **SWEETS**: Tannins < 0.2%  Total Acidity < 0.45%
- **BITTERSWEEETS**: Tannins > 0.2%  TA < 0.45%
- **BITTERSHARPS**: Tannins > 0.2%  TA > 0.45%

(Mainstream dessert apples are all Sweets or Sharps...)
Variety Selection

• Bittersweets/Sharps
  • Brown Snout
  • Browns Apple
  • Porters Perfection
  • Kingston Black
  • Dabinett

• Crossover varieties
  • Ashmeads Kernel
  • Egremont Russet
  • Calville Blanc
  • Baldwin
  • Hudson's Golden Gem

• Disease Resistant
  • Liberty
  • Goldrush
  • Suncrisp
  • Akane
  • Zestar!
  • King David

• Newtown Pippin
• Roxbury Russet
• Golden Russet
• Northern Spy
• Zabergau Reinette
Rootstock Selection

- Dwarfing
  - G11, G935, G41, B9, G30
  - Higher yield/acre
  - Quicker production
  - Needs permanent support (trellis)
  - Better light and airflow
  - May require irrigation in dry years

- Semi-dwarf
  - M111, M7, B118
  - Long to come into bearing
  - Better competition with ground cover
  - Less cost/acre to establish
Rootstock Selection

• Most of the best cider apple varieties, both Heirloom and European Bittersweet/Bittersharps are not “grower friendly”

• This makes it even more critical to properly match scion vigor with rootstock, and understand your soil “vigor”, or potential.
Rootstock – Scion Interaction

**Low Vigor**
- Dabinett
- Medaille D'Or
- Harry Masters
- Brown Snout
- Baldwin

**Medium Vigor**
- Tremletts Bitter
- Wickson Crab
- Porters Perfection
- Ashmead's Kernel
- Tompkins King
- Roxburry Russet

**High Vigor**
- Ellis Bitter
- Somerset Redstreak
- Yarlington Mill
- Chisel Jersey
- Northern Spy
- Kingston Black
- Golden Russet
Orchard Design

• Influences
  • Rootstock, soil, variety, site

• Considerations
  • Yield, labor/economic, space, fruit chemistry, equipment
Tall spindle – G11, G41, B9
Dwarf - M9, G935, G30
Semi dwarf – G30, M7, M11, B118
Production Per Acre

Culinary apples – 3.0 – 3.8 gal. per bushel off the press

European cider varieties – 2.5 – 3.0 gal. per bushel

Standard orchard – 25 by 25 = 70 trees per acre –
(years 6 – 15 – 200 - 300 bushels, older trees – 500 bushels)

Typical dwarf / semi-dwarf  500 – 700 trees per acre
600 bushels per year = 2.75 gal. per bushel of finished cider
1,650 gal. / 694 cases per acre per year

Modern dwarf orchard – 800 – 1,000 trees per acre
900 bushels per year = 2.75 gal. per bushel of finished cider
2,475 gal. / 1,041 cases per acre per year
Management of the Organic Cider Orchard

Disease Concerns

- Fireblight
- Scab (severe)
- Cedar Apple Rust (severe)
- CM/OFM
- Leafrollers/miners (young trees)

Tools:

- Cueva*
- Double Nickel
- Bt
- Grandevo
- Entrust, Cydex/Madex, Lime Sulfur, Dormant Oil,
Fireblight

- Plant for bloom time
- Weekly monitoring
- Prune out large strikes during dormancy
Remove Fireblight

Blossom blight phase

Bacteria spread to young twigs by insects

Insects carry bacteria to flowers

Bacteria migrate down to the branch

Droplets of ooze containing bacteria

Shepherd's crook

Spring

Bacteria overwinter in margins of cankers
FIRE BLIGHT DISEASE CYCLE

In spring, bacteria reactivate and multiply; cankers expand, ooze sticky droplets of bacteria.

Overwintering bacteria multiply, move through wood to nearby shoots, causing them to blight.

Infections expand from succulent shoots into supporting wood, causing cankers.

Bacteria from blighted shoots move systemically within the tree; cause blight of susceptible rootstock, killing the tree.

Susceptible rootstock suckers become infected; infection expands and causes rootstock canker, killing the tree.

Bacteria are spread from blighted clusters to young growing shoots; infection occurs through wounds.

Repeated infections of succulent shoots occur through wounds, as bacteria are spread by insects and rain.

Insects, rain, wounds

Flower cluster becomes blighted

Insects, rain, wounds

Bees transfer bacteria to additional flowers; bacteria multiply on stigmas at temp. > 65°F

Rain washes bacteria to natural openings at flower base; infection occurs

Insects are attracted to ooze, transfer bacteria to flower stigmas.

Insects

Early Spring

Bacteria overwinter in cankers

Late Spring
Fireblight Resistant Rootstocks

All Geneva series rootstocks were bred for resistance

G11, G41, G30, G935
Bud9, and Bud118 also resistant

Susceptible rootstocks
M9, M26
Management of an Organic Cider Orchard – Other Concerns

• Small fruit, set in tight clusters, hard to thin and biennial
• Uneven ripening within pairs or clusters, lots of push-offs
• Premature drop of unripe fruit makes after-ripening essential to obtain good quality juice for fermentation
• Heat stress and sun-burn on many (not all) Bittersweets
• Vigorous sprawling growth habits, lots of blind wood
• Viruses in available budwood (avoid sensitive rootstocks)
Biennialism
How to Prevent Bienialism

- Thinning!
  - “Chemical thinning”
    - FOLS
    - Blossom Thinner
  - Hand Thinning
  - Pruning

- Plant annual bearing varieties

- Expect Bienialism
Cornell University – Variety Trial

Dr. Ian Merwin planted 1 acre 650 trees in 2003 of European Cider Apples.

Spacing 4 by 14 for dwarf – M9, G16 and 6 by 14 semi-dwarf, G30
Varieties – Tremlett's Bitter, Ellis Bitter, Major, Dabinett, Harry Masters Jersey, Chisel Jersey, Binet Rouge, Brown snout, Somerset Redstreak, Medaile de Or'

Tremblitt’s bitter seems to be the most resistant to fireblight (earlier bloom)
Dabinett is the most annual bearing variety.

Harvest Data : 2009 – 658 bushels
2010 – 519
2011 – 778
2012 – 259
2013 – 750
» 2014 – 438
» 2015 - 775
Weed Control

Organic methods to reduce weed and grass competition:

Chip Mulch – Good for soil, expensive

Biodegradable Paper Mulch – Expensive to apply

Straw Mulch – Need to rake away in August

Flame weeding – I’d like to try this year

Tillage – Wonder Weeder -4 cultivating heads / Weed Badger – rotary head
**Ground-cover Mgmt.**

**Bark chips** – In dwarf Tall Spindle, spreading approx. 2.5 yards/100 row feet. Paid $9.00 per yard.

**$22.50 per 100 row feet. 30 min. labor per 100 row feet**

In Semi-Dwarf spreading 2.5 yards per 25 trees. 30 min. labor per 25 trees

**Paper Mulch** – In dwarf tall spindle, 260 row feet in one hour with two people.

Paper covered with straw, and rocks. Cost $0.125 per foot. Straw - 2 per 260 feet - $6.00

**100 row feet = $12.50 paper + $2.31 = $14.81/100ft**
Geese in the Orchard

Graze grass & weeds
Fertilize
Chase deer & rabbits?
Eat fallen leaves
Eat apples
Strip bark in winter on young trees
Sheep in the Orchard

Graze grass

Fertilize

Eat fallen leaves

Severely damage/kill trees

Works better with older higher trained trees
Harvest and Post Harvest Treatment of Cider Apples

Picked off the ground

Multiple pickings

Generally sweated – weeks to months before pressing
Wild Apples

Wild crabs have a lot of potential
Disease resistant
Often full of acidity / tannin
Should be collected for cider
Should be grafted, propagated
The Apples Make the Cider

- The cider making process starts in the orchard
- Once you understand the way to get from fruit to a fermented beverage you realize that the majority of your “beverage manipulation” happens in the vineyard or orchard.
Growing Cider Apples

WHAT IS TERRAIOIR?

local winds
humidity
CLIMATE
temperature
rainfall

birds
FAUNA
pollinating
insects

composition
microorganisms
SOIL
fertility
pH levels

organic
practices
HORTICULTURAL
SKILLS
permaculture

unspoiled
countryside
REGION
distance from
pollution

slope
elevation
TERRAIN
proximity
to coast
Growing Cider Apples

• Terroir

Flavors from your fruit starts with the soil they are grown on and is influenced by agricultural practices such as planting systems, irrigation, nutrition management, understory management, etc…
Small scale farm cidery start-up
Sourcing Fruit

- Own Orchard
- Buying Fruit or Juice
- Fallow Orchards
- Wild Trees
Sourcing Fruit

Own Orchard

- Control over location, variety selection and management choices
- Located near your cidery to minimize transportation
- Enjoyment of orcharding – more in tune with the fruit
Sourcing Fruit

Buy Fruit or Juice

- Relatively easy to source, but hard to find high quality cider fruit
- Management and soils have huge effect on the quality of the fruit
- Possible contract – more control over varieties, soils & management decisions.
Sourcing Fruit

Fallow Orchards

- Interesting varieties
- Communication with landowners
- Management: Pruning, spraying, mowing, harvest – ripeness, access, transportation often organic
- Topwork?
Wild Trees

- Interesting flavor properties
- Communication with landowners
- Access can be very difficult and inefficient, enjoyable, almost always organic
Wild Harvest

- Wild Harvest away from the road
- 16 Man-hours yielded 18 bushels
Sourcing Fruit
Cidery Equipment
Press

- Things to consider with the press
  - Juice yield
  - Clean up, labor at hand
Tanks, Pump/hoses

- Tanks – Fermentation, Storage / Aging
Filtration

Filtration is necessary for stable cider.
Force carbonating

- Bright tank – 150 gal
- Can be sterile
- Cornelius kegs
- Good for smaller batches
Bottling

- Counter pressure filling – one person
- 40 cases – 100 gal. / 8 hr.
Versatility – moveable tanks

- Cooler -
- Case goods
- Bulk cider
Cidery Licensing

• Farm Cidery
  • All products under 8.5% ABV
  • Ability to sell in grocery stores and other places where beer is sold

• Farm Winery
  • Ability to make wine or cider
  • Products up to 24%
  • Product can be labeled as wine or cider if it meets definition of both
Cidery Licensing

- TTB Basic Permit
- SLA Permit
- Marketing Permit
- Sales Tax Certificate
- Distributors permit
Hard Cider is the “Wine” of the Apple

- Brewing Beer is as different of a process to making hard cider as making wine is to brewing beer.

- Making Hard cider (any scale) is generally the same process as making a white wine or a sparkling wine, and cider can be made following typical Red wine techniques.
Crafting a Cider

(1) Press for pH – Generally try to ferment 3.3 – 3.6 for microbial stability, Prevent Spontaneous Mal-lactic bacteria, oxidation.

Press many lots and ferment separately

- Blend and tweak, later
Crafting a Cider

(2) Add yeast (or wild), and yeast nutrients – Cider especially from “cider” orchards are low in Yeast Available Nitrogen (YAN).

Add Potassium Metabisulfate (SO2)

Ferment at 50-60 degrees F

(3) Ferment to Dryness or stop fermentation Early
Crafting a Cider

(3) Rack and add (more) SO2 quickly – Don’t wait!

Seal in Airtight container, let it settle

(4) Discourage ML Fermentation (or not). - Keep cool, under 45 degrees to prevent Spontaneous ML or Lysozyme

(5) When clear taste and decide what it needs to make the cider you are trying to make. More acid, more tannin, aroma, etc.....
Crafting a Cider

(6) Decide on how to finish and bottle. Depends on many factors.

   Sparkling/Still
   Natural Carbonation/ Forced
   Dry / Off-dry

(7) Storage of bottled cider – Either Cider is 100% stable, or keep cool, or sell quick! Cider is less stable at 7-8% alc. then wine 13% alc.
Questions?

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