

HOP HEAVEN



Hops, Hops and More Hops!

A brewers review of hops.

Ted Hausotter

Talk Outline

- **Farmers View**
- **How they are processed**
- **Hop Families**
- **New Varieties**
- **How to Use**
- **Class Beer info**
- **Why not more acreage**

Hops, the Farmers View



The world is Black and white, they must make a profit. All hops grown must fit through the small green hole.

Constraints

- Volume
- Variety
- Ripening Time
- Equipment Capacity
- Growing Conditions
- Pests

How Hops are Processed



Hop Field in Moxee, WA



Downtown Moxee

Picking Machine





Hanging Hops

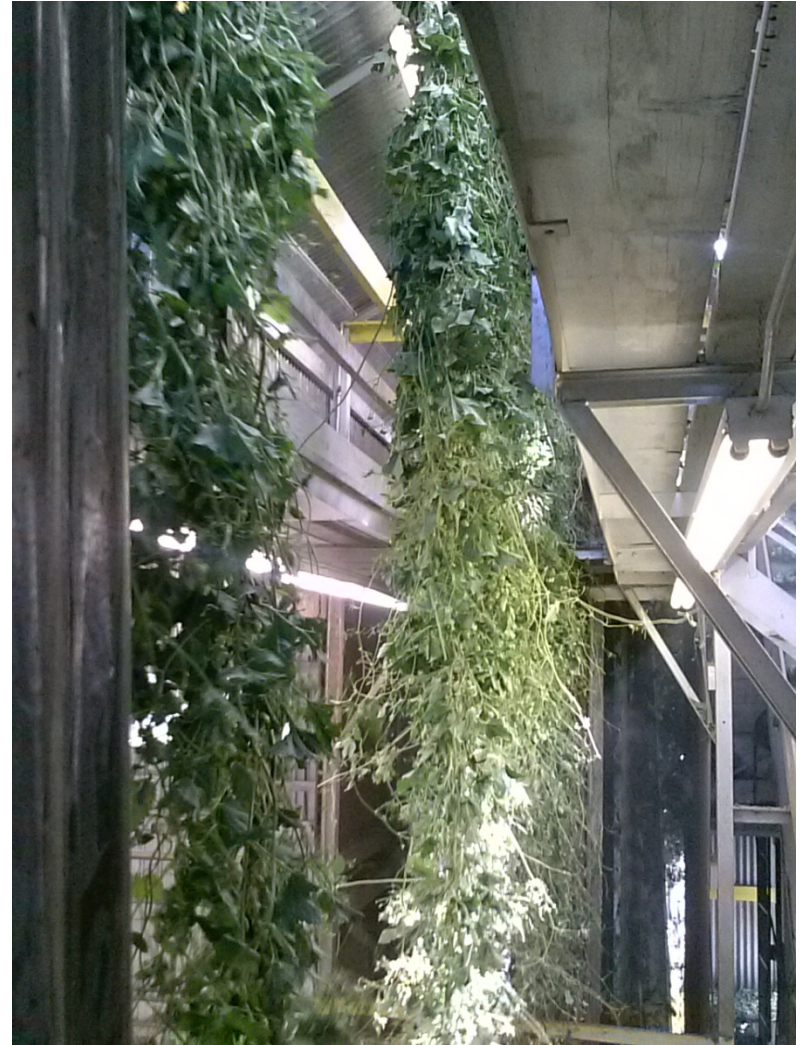
Hops going into the picker



Hop bines coming out of the picker



The goal is to remove the cones intact, leaving the bines



Hop Cones Being Cleaned



Hop cones being transported from the picker



Hop cones roll down while the leaves and stems are carried up the conveyors. Each sloped conveyor removes more stems.

Kilning Hops



Hops are kilned in the 140-150° range, warm air blows up through the floor. They are dried to 6-10%

Hops Resting



Normal to let them sit 24 hours for moisture to even out

Special thanks
to Jodie, my
wife for putting
up with my
hop obsession.



Sending Hops to the Baler



Baling Hops



Almost all hops leave the farms in bales. Bales weigh 200#



What makes a bad hop on the Farm?

- **Picking green**
 - Timing
 - Pests
- **Soil**
- **Growing Conditions**
- **Kilning**
 - Over drying
 - Too Hot
 - Under Drying (mildew)
- **Varietal Purity (some are grown for alpha)**
- **Strain**

Hop Families

- **USA Family Hops:** Strong tendency for citrus, especially orange and grape fruit. Pine, juniper, resinous, catty, course
- **English Family Hops:** These are more herbal and earthy. Wood notes. In high use rates citrus is found.
- **German Family Hops:** Spicy and herbal, some floral notes. In high use they tend to go to lemon
- **Southern Hemisphere Hops:** These tend to go more tropical. Pineapple and peach are common. Closer to the USA hop family, with a shot of tropical sauce.

USA Family Hops

- **Amarillo**
- **Apollo**
- **Bravo**
- **Calypso**
- **Cascade**
- **Centennial**
- **Chinook**
- **Citra**
- **Cleopatria**
- **Cluster**
- **Columbus**
- **CTZ**
- **El Dorado**
- **Galena**
- **Horizon**
- **Meridian**
- **Mosiac**
- **Northern Brewer**
- **Nugget**
- **Perle**
- **Simcoe**
- **Sorachi Ace**
- **Summit**
- **Tomahawk**
- **Warrior**
- **Zeus**

Above list is not a complete list, just the more commonly used hops

English Family Hops

- **Admiral**
- **Bramling Cross**
- **Challenger**
- **Comet**
- **First Gold**
- **Fuggle**
- **Golding**
- **North Down**
- **Phoenix**
- **Pioneer**
- **Progress**
- **Target**
- **WGV**
- **Willamette**

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German Family Hops

- **Crystal (Hallertau)**
- **Hallertau**
- **Liberty (Hallertau)**
- **Magnum**
- **Mt Hood (Hallertau)**
- **Northern Brewer**
- **Perle**
- **Santiam (Tettnang)**
- **Saaz**
- **Spalt**
- **Sterling (Saaz)**
- **Tettnang**
- **Ultra (Saaz and Hallertau)**

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Southern Hemisphere Family Hops

- Helga (AU)
- Galaxy (AU)
- Topaz (AU)
- Dr Rudi (NZ)
- Green Bullet (NZ)
- Motueka (NZ)
- Nelson Sauvín (NZ)
- Pacific Gem (NZ)
- Pacific Jade (NZ)
- Rakau (NZ)
- Southern Cross (NZ)
- Wakatu (NZ)

Above list is not a complete list, just the more commonly used hops

New Hop Varieties

- **Azacca:** Tropical and citrus
- **Caliente:** stone fruit
- **Cashmere:** Coconut, tangerine and lemon
- **Cleopatria:** US family with some tropical and noble notes
- **El Dorado:** US family with some tropical tendencies.
- **Equinox:** US IPA hop with tropical tendencies
- **Hallertau Blanc**
- **Huell (Hüll) Melon:** similar to New Zealand hops, works with spice
- **Jarrylo:** Banana, pear, orange, spicy
- **Lemon Drop:** lemon
- **Madusa:** peach very low alpha
- **Mandarina Bavaria:** mandarin oranges
- **Polaris:** candy, mint
- **Tahoma:** moderate citrus, spicy, woody
- **Triple Pearl:** Classic orange and lime, melon, pepper, pine
- **Vic Secrete:** clean passionfruit and pineapple flavors
- **Yakima Gold:** Aggressive American, lemon and grapefruit

Hops, old ones remarketed

- **Gargoyle: a California Cluster that is being renamed and marketed. Has passion fruit notes.**
- **Ivanhoe: Another California cluster variety, more English in nature**
- **Rio: a Spanish hop that is making its way into America**

Hop Combos that work

- **Cascade and Centennial**
- **Cascade, Centennial, CTZ**
- **Cascade, Centennial, CTZ, Citra**
- **Cascade, Centennial, CTZ, Simcoe**
- **Citra and Galaxy**
- **El Dorado and Simcoe**
- **Hallertau, Liberty, Santiam, Sterling, Saaz**
- **Golding, Willamette**
- **Golding, Fuggle**

Hop Specifications

- **Alpha:** is the bittering acid in the hop
- **Beta:** will contribute to bittering as the hop gets old, tends to be harsh
- **HSI:** Hop storage index; alpha acid lost over 6 months stored at 68°. Open storage in bales.
 - Does not indicate directly about oils
 - .20-.32 is pretty normal for incoming hops from the farm.
 - .40 and above you want to avoid, close to cheese
 - Farm, crop and variety dependent!
 - Store your hops cold, it slows down aging
 - Store your hops in a barrier bag

New Hop Techniques

- Add More
 - Traditional hop dosage is 1 lb per barrel light hop, 2-3 lb/barrel for high hop beers such as IPA. This includes the bittering hops.
 - Current IPAs are being made with 11 lb per barrel, 5.5 oz per gallon!
 - We used to think we were making a hop bomb Pilsner if we added ½ oz more in a 5 gallon batch. I am seeing Pilsner recipes with twice the hops from 15 years ago
 - This includes ALL hop focused styles of beers
- Add later in the process
 - APA can be made with no bittering additions
 - Hop Bursting: Late boil hops, last 15-20 minutes
 - Whirl pool hops, after flame out, some brewers never boil a hop
 - Double and Triple dry hopping, give the fresher light notes of the dry hop
- More Varieties.
 - In 1990, brewers used 6 hops to brew American, English and German styles, now you have over 120 choices.
- Make 6 gallon batches, hop drink a lot of beer, this way your keg will be full

Hop Bursting

- To help get the bright fresh flavors from your hops, late addition boil times allows more of the delicate oils to survive the boil.
- This is for hop forward beer styles!
- Add hops during the last 0-20 minutes of the boil
- Amount depends on flavor impact desired, following are what I am seeing
 - IPA 1-2 oz per gallon
 - APA .75-1.25 oz per gallon

Whirlpool Hopping

- Whirlpool hopping is adding hops at flame out. Wort is not chilled.
- Bitterness is extracted. Class beers have no boiled hops.
- 15 minutes is the typical time brewers will let the hops steep
- Late addition hops will increase their bitterness contribution as the hops steep
- Chill quickly
- Hops may not play well at first, some may need to rest for 30 days.

Double, Triple Dry Hop

- Use multiple dry hoppings to achieve a bright fresh hop flavor, leaving the vegetal notes behind
- Dry hop for 1-3 days, push beer into new keg
- Repeat for as many times as you want to dry hops
- Oxidation can easily ruin your beer



How to Dry Hop



- Place hops in keg
- Add priming sugar
- Purge Keg
- Push beer into the keg
- Wait 5 days
- Sample
- Best in 2 weeks



Class Beers

- 1.055 -1.060 OG
- Base Malt: Marris Otter
- Boil: 15 minutes
- Add 1 oz hops per gallon at flame out, hold for 15 minutes
- Yeast W001 white labs
- .4 oz/gal hops dry hops 5 days

Single hop beers served

- El Dorado
- Equinox
- Mandarina Bavaria
- Lemon Drop



Class Beer Brewers

- Special thanks to the brewers who contributed their skills and time making the beers served today!
 - Patrick Colchin
 - Ryan Reschan
 - Richard Solis
 - Eric Shelley



Why not More Acreage?

- Trellis and irrigation cost \$10,000 per acre
- Cost \$5-6,000 acre to harvest (no fixed costs)
- Picking machine cost is \$1,000,000
- Fitting the ripe hops through the harvesting schedule
- Brewers are fickle
- Houses pay better



Thank You for Attending!



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The home of Heavenly Hops!