



# The Versatility of American Hops for Craft Brewers

Oregon Hop Commission

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# The Versatility of American Hops – Our Panelists

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- Matt Brynildson (Brewmaster, Firestone Walker Brewing Co.)
- Dr. Val Peacock (President, Hop Solutions Inc.)
- Blake Crosby (Oregon Grower, B. Crosby Hop Farm)
- Darren Gamache (Washington Grower, Virgil Gamache Farms)
- Brian Hunt (Brewmaster, Moonlight Brewing Co.)
- Dan Carey (Brewmaster, New Glarus Brewing Co.)
- Tom Nielsen (R&D Senior Analyst, Sierra Nevada Brewing Co.)
- Scott Jennings (R&D Head Brewer, Sierra Nevada Brewing Co.)



# Outline

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1. The Versatility of American Hops for Craft Brewers
2. History of U.S. Hybrids of European Aroma Hops
3. Pilot Brew Presentations
  - Moonlight Brewing Co.
  - New Glarus Brewing Co.
  - Sierra Nevada Brewing Co.
4. Brewer – Grower – Breeder Cooperation
5. Questions



# The Versatility of American Hops

## Why are we discussing the versatility of American hops at the CBC?

- To ensure craft brewers are aware of the full portfolio of hop varieties grown in the U.S.
- To explore how craft brewers can better leverage the wide variety of American hops in their recipes.
- To hear from brewers on what characteristics are most important to them—helping to improve communication between craft brewers, growers, and breeders.



# The Versatility of American Hops

## Aren't we preaching to the choir?

- BA hop survey = 80% of hops used by craft breweries are U.S.-grown (excluding Boston Beer Co.)
- Craft brewers used an estimated 5.8 million lbs of American hops in 2010 = 6% of the 2009 U.S. crop (a big number considering approx 75% of the crop is exported).
- Approximately 25% of the total U.S. aroma crop is consumed by the craft sector.
- The use of “uniquely American” aroma hops has become part of the U.S. craft brand and has contributed to its success



# The Versatility of American Hops

**So yes, we may be preaching to the choir, but...**

- We want increased dialogue with craft brewers who use more European hops than the average craft brewer.
- Many brewers have overlooked U.S. hybrids of European aroma hops, and how these hops could provide a “craft version” of an old classic, if not substitution.
- We want to increase brewer knowledge of lesser known U.S. varieties, **and more importantly, hear what varietal attributes brewers would like to have grown in the future.**



# The Versatility of American Hops

**Hoppy IPA's, which rely on unique U.S. aroma varieties, are among the most popular craft beer styles, so why are we talking about European-style hops and beers?**

- U.S. growers would like to supply hops to craft brewers for all beer styles, and this is one area (albeit small in the overall craft segment) where there is room for growth
- The “brewing pendulum” may very well swing back in the other direction toward more traditional beer styles such as lagers and pilsners (which might call for more European style hop varieties)



# American Hybrids of Classical European Aroma Hops: A History and Current State

Dr. Val Peacock  
President, Hop Solutions, Inc.





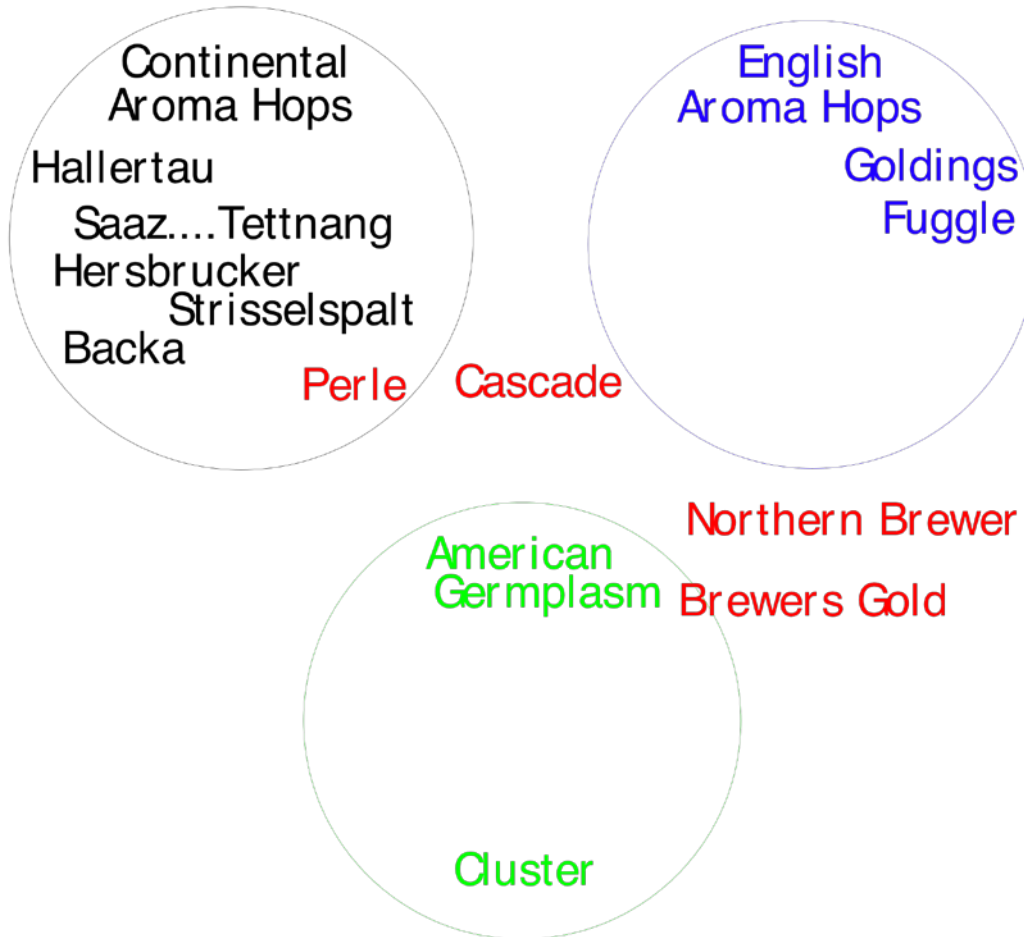
# Past, Present, and Future of Breeding Hybrids of European Aroma Hops

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- What is a hybrid hop and why should you care?
- Motivation and History of hybrid hops.
- What makes a hybrid hop successful?



# Hop Germplasm sources



# Why Hybrids?

- Cross old European varieties with American and other germplasm to improve yield and pest resistance while (hopefully) maintaining a similar flavor profile.
- Must be accepted by brewers to be a success!
- Willamette is good example.....



# Willamette

- Fuggle: Low Yields – Seeds
- Tetraploid Fuggle X Fuggle Seedling (1967) = Willamette
- 30-40% higher yield – triploid = low seed
- Chemistry & Flavor close to Fuggle → Success!
- Found success not only as a potential replacement for Fuggle, but as a base hop for Lager beer – a new frontier for craft brewing?
- Already the 3<sup>rd</sup> most popular hop for craft brewers, but now is a good time for increased consideration.



## US Brewing Industry in 1970's

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- Most big U.S. brewers (founded by Germans) used significant amounts of imported European hops – Baled hops! (Storage properties very important!)
- These breweries especially prized traditional European hops and viewed them much like wine makers view “Classic” wine grapes.
- “Brand-name” hops – Substitutes not wanted



## US Brewing Industry in 1970's

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- But if it is not possible to get these hops – then thinking **MUST** change.
- Verticillium wilt threatened Hallertau mf production in Germany in 1960's and 1970's. Very real possibility this hop would no longer be available.
- Brewer solutions: Grow it elsewhere
  - Resistant hybrids: U.S. and Hüll



# USDA Hallertau mf Hybrids

- Mt. Hood – 1983 cross – released 1989
- Liberty – 1983 cross – released 1991
- Crystal – 1983 cross – released 1993
- Vanguard – 1982 cross – released 1997



# Mt. Hood

- Received very positively by brewers with chemistry and aroma similar to Hallertau mf.
- Over 2,000 acres in U.S. by mid-1990's, but only about 300 acres today.
- Decline was influenced by:
  - Shift to high alpha varieties
  - Poor storage as a baled hop (can be overcome by use of pellets)
  - Resurgence of Hallertau mf in Germany





# Liberty

- Released 2 years after Mt. Hood
- Of the four triploid Hallertau mf varieties released by USDA, Liberty has perhaps the closest chemistry to Hallertau mf
- But brewers have typically preferred Mt. Hood (always less Liberty acreage than Mt. Hood)



# Crystal

- Its release after Mt. Hood inhibited its initial acceptance by major brewers
- Stores poorly as baled hops, but not a problem with pellets
- Growing interest among craft brewers (Example: Sierra Nevada)



# Vanguard

- Reputation as having the closest chemistry and flavor to German Hallertau mf.
- Several large breweries and one medium size brewer showed significant interest.
- Storage very good, 15% CoH
- Hallertau mf resurgence in Hallertau in 1990's reduced interest in later in the decade.



# Saaz & Tettnang Hybrids

- Both hops are very similar. They are grown in the U.S., but yields low and quality variable (sunburn).
- Possibly solved with hybrids?
  - Saaz → Sterling
  - Tettnang → Santiam



# Sterling (Saaz Hybrid)

- Bred in 1990 and released in 1999 (Saazer 38 X a Cascade son)
- A bit more alpha than Saaz and a bit less beta
- 22% CoH – storage good
- Oil profile is similar
- Aroma considered comparable by many brewers
- Little interest by most major brewers (except Coors), but has become popular among the craft sector
- It was the 5<sup>th</sup> most popular variety in the 2009 BA survey



# Santiam (Tettnang Hybrid)

- 1988 cross of diploid Tettnanger with tetraploid Hallertau mf and Cascade derived male
- Resin, oil and flavor profile similar to Tettnang but with the lower CoH of Hallertau.
- Santiam imparts a “European” character in beer when used fresh, but it stores so poorly that it was not acceptable to baled hop users (AB dropped its contracted acreage for this reason).
- With increased use of pellets over the last decade, craft brewers should take a new look at this variety!

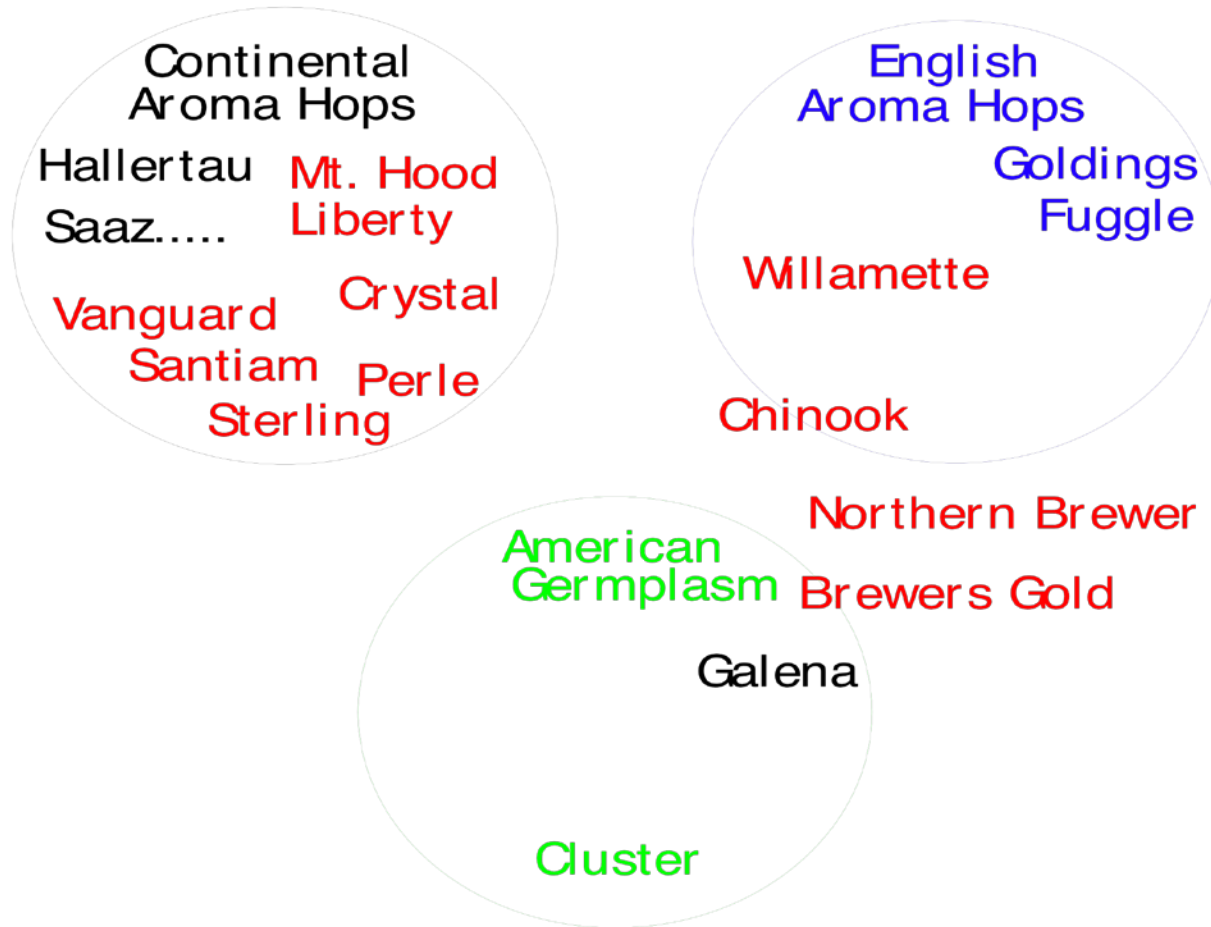


# How should the brewer assess these hybrid hops?

- Inclusion in a flavor category
  - Continental Aroma (brown spice, herbal)
  - English Aroma (citrus, fruity, floral)
- Does the hop fit the general flavor profile?
- Does it produce the flavor you want?
- Perhaps it contributes something new that was missing in traditional cultivars.



# Brewer must decide how well each hybrid falls in its target circle

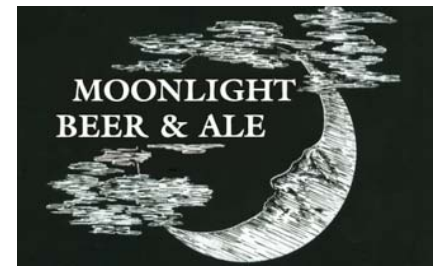




# Possibilities for the Brewer

- Continental-style U.S. aroma hops for Lagers and Pilsners. What substitutions work?
- Continental-style U.S. aroma hops as substitutes for English-style aroma hops in Ales, etc. What will work?
- Now, let's look at some possibilities.....





- “Reality Czeck-style Pils”
- Moonlight’s Czech Pils features U.S.-grown Perle vs. the same recipe with Czech Saaz
- The Saaz had a subtlety and flavor of beers in Czech Republic
- West Coast drinkers and lifestyle seemed to need a bit more vibrancy that Saaz couldn’t provide
- Subtlety and cleanness of Czech style maintained with U.S. Perle





# New Glarus Brewing Co.



- “Two Women Lager”
  - Just released, year-round Amber Lager
  - Brewed for good drinkability and robust shelf stability
  - OG: 12°P, ABV: 5%
  - Hallertau mf hops (low to mid 20’s IBU’s)
  - Color: Light Brown (23 EBC)
- “Two Women Lager—Oregon Signature”
  - Test brew for CBC (40 bbl test batch) using Oregon Cascade, Willamette, and Mt. Hood hops
  - Slightly higher IBU’s with the Oregon hops
- Both brews made with Weyermann Bohemian Floor Malt and Caramel Malts using a step infusion and three hop additions





1. American Pale Ale aroma hopped and “torpedo” dry hopped with Oregon Crystal
  2. American Pale Ale aroma hopped and “torpedo” dry hopped with German Hallertau Mittlefruh
- Beers are nearly identical aside from aroma and dry hopping hop additions

- OG: 13.2°P
- IBU: 37-38
- ABV: 5.6%
- Color: 12

- Pale Malt and Crystal 60
- California Ale Yeast
- Fermented at 72° F
- 0.5 ml cells/ml/plato





Bittering Hops: Oregon Magnum (14.6% alpha): Same for each brew

## Aroma Hops

1. Oregon Crystal (5.6% alpha): 3 lbs @ 10 min before kettle strike, 2 lbs @ kettle strike, and 3 lbs in hop back (8 bbl brew)
2. Hallertau mf (4.3% alpha): 4 lbs @ 10 min before kettle strike, 3 lbs at kettle strike, 3 lbs in hop back (8 bbl brew)

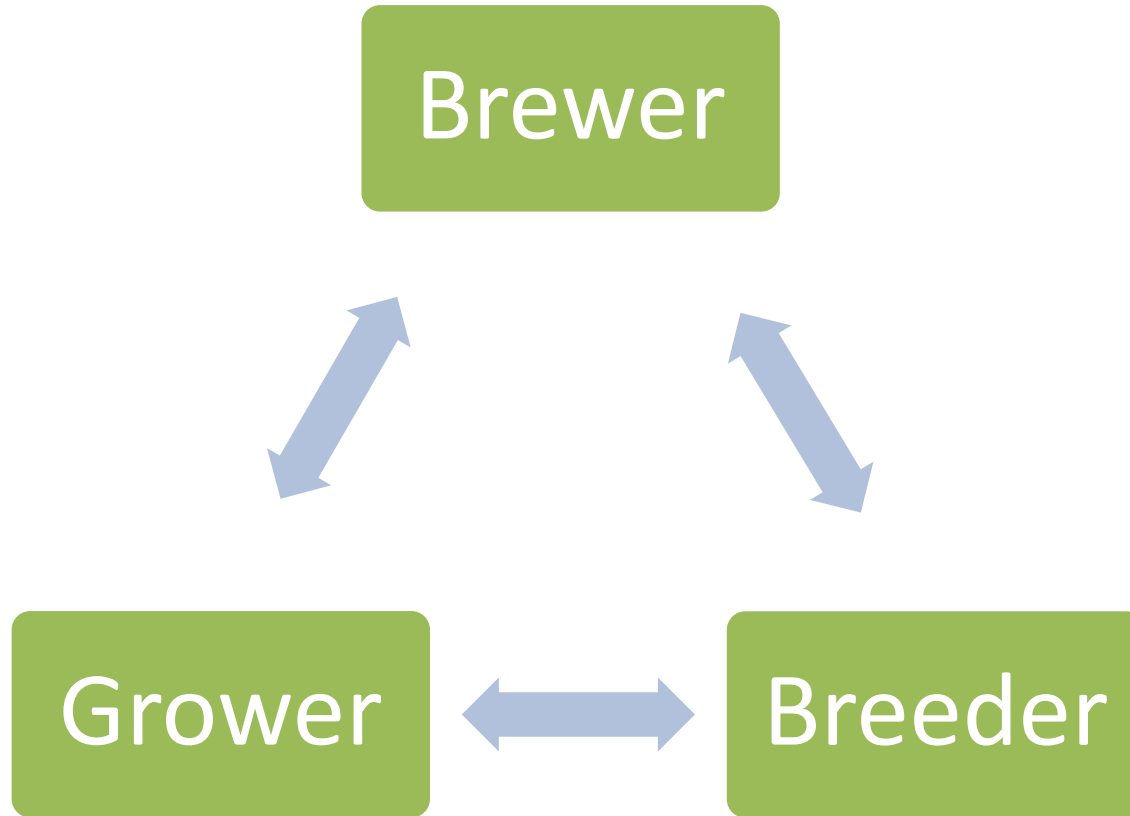
## “Torpedo” Dry Hopping

*(Torpedo was conducted in the bright beer tank at 29 °F)*

1. Oregon Crystal: 0.5 lb/bbl, circulated for 1 hr @5 gpm
2. Hallertau mf: 0.5 lb/bbl, circulated for 1 hr @ 5 gpm



# Industry Cooperation



# Why Cooperation?

- Brewers need to communicate to breeders what they want from new hops. Breeders want this!
- A new hop will only be successful if it is accepted by brewers.....
- Grower – Breeder interaction fairly well established....but smaller brewers have traditionally not been very involved.
- Cooperation is improving
  - Hop Quality Group (est. in 2010) = Bell’s, Boston Beer, Firestone Walker, New Belgium, New Glarus, Odell’s, Russian River, and Sierra Nevada
  - Motto: “Craft Hop Quality: Oils not Alpha”



# What should the Brewer do?

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- 10 year process – get in the loop
- Join Hop Research Council (HRC) and attend meetings. HRC's focus is USDA public breeding programs.
- Contact/visit dealers and ask about their private breeding programs.
- Ask for hops to test brew and give feedback.
- Visit growers who are raising test plots – you will learn much.

