



# Dry Hopping

Philosophy  
and Best Practices

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Breakside Brewery  
Portland, OR

October 2017,  
Eugene, Oregon

District Northwest

# Breakside Brewery Background

Founded 2010

Brewed/sold 19,00 barrels in 2016; on track for ~23,000 bbls in 2017

Currently operating 3 breweries: 30 barrel, 10 barrel, 3 barrel.

Contracted 146,000 lbs of hops in 2017, 31 different varieties (used 61 in total)

Contracts and selections across a wide range - not just IPA aroma varieties

Produce a wide range of styles (100+) but hoppy beers are our bread and butter



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Amarillo	Bravo	Cascade	Rakau
Centennial	Comet	Chinook	Lemondrop
Citra	Columbus	El Dorado	Mosaic
Ella	Enigma	Nelson Sauvin	Crystal
Wai-Iti	Hallertau MF	Idaho 7	Liberty
Opal	Styrian Golding	Ultra	Grungeist
Nugget	Styrian Wolf	Galaxy	Huell Melon
Simcoe	Vic's Secret	Summit	Topaz
Hallertau Blanc	Mandarina Bavaria	Waimea	Motueka
Azacca	Hersbrucker	Eureka!	Mt. Hood
Calypso	Falconer's Flight	Strata	Cashmere



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# The Breakside Approach



When making hop-forward beers, focus on a flavor and aroma target rather than specific varieties of hops.



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## Why target flavor/aroma profile over specific varieties?

Varietals change year-to-year and farm-to-farm, and you can't always get the lots you want

Allows for you to be less rigid with hop contracting and able to navigate the spot market more nimbly. Can save \$\$\$.

Promotes more experimentation & learning - gets you out of the rut

Challenges you to better understand your overall hop needs and capacities

Forces ongoing evaluation of the beer

Stops varietal tunnel vision



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## Items to consider with this approach

- Develop Sensory Program that is appropriate for your brewery
  - embrace different opinions and preferences
  - develop a pool of tasters
  - don't just look for off flavors
- Define "True to Brand" and get it out of your head
  - Color
  - Appearance
  - Aroma
    - Primary + Secondary + ABSENT
  - Flavor
    - Primary + Secondary + ABSENT
  - Bitterness
  - Mouthfeel



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## Items to consider with this approach

- Consider other impacts to flavor/aroma perception
  - Chemical technical specs are an important part of true to brand descriptors
  - No use in chasing an aroma/flavor target until key metrics are dialed in
    - OG/TG/ABV/IBU
    - Mash and Finished beer pH
    - Cell Count at Time of Dry Hopping
    - CO<sub>2</sub>, DO and TPO
    - Non hop-related flavor components
- Implementing changes and where to test
  - Depends on where the "problem" is once you see variance from a true to brand description
  - Hotside vs. cold side trials
  - Blended vs. discreet hop additions
- Tracking hop lots



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## Our Core Hoppy Beers and their true to brand aroma descriptions

**Breakside IPA**  
piny, tropical, orange, classic

**Wanderlust IPA**  
dank, grapefruit, tropical, pine

**Lunch Break**  
peachy, citrus, juicy fruit

**India Golden Ale**  
pineapple, pine, mango

**Stay West**  
dank, grapefruit, resin

**Bazooka Face**  
tangerine, Sunny D, pine



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## Breakside IPA

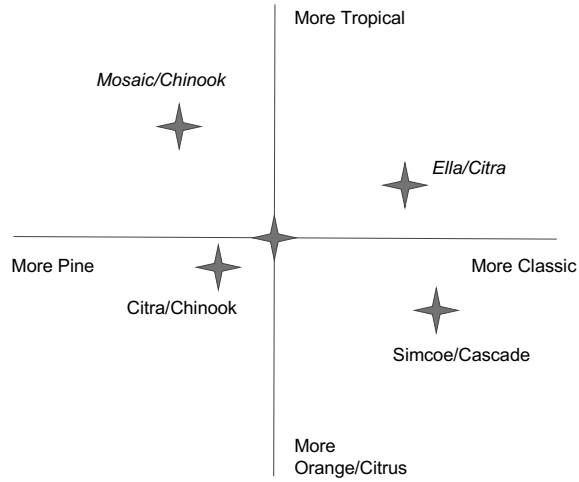
piney, tropical, orange, classic

**Pine:** Chinook, Columbus, Simcoe, Ella

**Orange:** Citra, Simcoe, Chinook

**Tropical:** Citra, Mosaic, Ella

**Classic:** Simcoe, Chinook, Cascade, Falconer's Flight



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## Wanderlust IPA

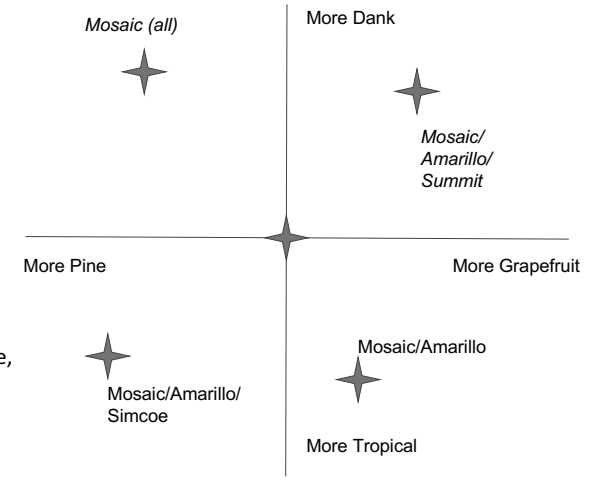
dank, tropical, grapefruit, pine

**Dank:** Mosaic, Columbus, Simcoe, Summit

**Tropical:** Mosaic, Citra, Simcoe, Amarillo

**Grapefruit:** Mosaic, Simcoe, Cascade, Summit

**Pine:** Mosaic, Chinook, Columbus, Simcoe



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## PULLING BACK THE CURTAIN

### Things we have learned (the hard way)

- Hops are damned expensive
- Hop selection is important, but not for what you might think
- More isn't necessarily better
- Pellet density effects yield
- Some hops "perform better" on the hotside
- Anchor hops make a difference
- Tank dimensions can affect dry hop impact
- Hops have enzymes and simple sugars (increased VDK potential)



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## Best Practices

### Poll information from other great breweries

- Be sanitary
- SAFETY!!!
- "Blanket" with CO2
- Cap under pressure after addition
- Stable gravity (don't shower yourself)
- Un-opened/fresh/whole bags
- Don't use old hops, HSI is real and effects bitterness
- Rouse with CO2 after dry hopping ("bursting" or "blasting")
- Fermentation temps not cold
- New technology not widely used



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# VOODOO?

- lights off
- closed doors
- micro-oxidation
- whole leaf
- cooling to the whirlpool
- different hop “bursting”
- recirculation
- biotransformation
- yeast in suspension
- ”sacrificial lamb”
- variety doesn’t matter, just use a lot
- 28 day tank residency time



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## Dry hopping beers with >40 IBU's

[https://hopsteiner.com/wp-content/uploads/2017/02/2017-02\\_TS\\_Bitterness.pdf](https://hopsteiner.com/wp-content/uploads/2017/02/2017-02_TS_Bitterness.pdf)

## Dry hopping beers with <20 IBU's

[http://www.brauweltinternational.com/pdf/BRAUWELT\\_International\\_hopsteiner\\_03\\_2017.pdf?platform=hootsuite](http://www.brauweltinternational.com/pdf/BRAUWELT_International_hopsteiner_03_2017.pdf?platform=hootsuite)

## Unintended Over-attenuation from dry hopping

<https://www.brewersassociation.org/presentations/unintended-over-attenuation-from-dry-hopping-beers/>

## Screening of Geraniol and $\beta$ -Citronellol from different hop addition times

<https://www.asbcnet.org/publications/journal/vol/abstracts/ASBCJ-2014-0116-01.htm>



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# CHEERS!

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