



# Hop Reference Book

2018

Reference: The Hops List First Edition

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## Cascade (US)

Pioneered in the 1950's by Jack Horner and his team at Oregon State University, Cascade has since gone on to become one of the most popular American hops of all time. Released in 1972, Cascade now represents around 10% of all hops grown in the US. It features an excellent vigor and yield and when brewed exudes a distinct spicy citrus aroma with hints of grapefruit. Well suited to just about any ale and lager, its use is particularly popular in American Pale Ales. Its relatively poor storage stability tends to be a non-issue with its popularity and subsequent large production volumes from major US breweries ensuring harvests don't sit idle for long. Cascade was originally developed through open pollination of English variety Fuggle and the Russian variety Serebrianka and is named after the Cascade Range, mountains that run from northern California all the way north to British Columbia, Canada.

### Brewmaster's Comments

Cascade hops are definitely a favorite variety for us for a few reasons. First, it is the only hop that we use in our Mirror Pond Pale Ale. Cascade hops offer both floral and citrus aromas and exceptionally clean, balanced bittering qualities. They also work in concert with other varieties very well. Use them for any addition, especially late when floral aromas with citrus undertones are desired. (Ryan Schmiede, Assistant Brewmaster at [Deschutes Brewery](#))

Cascade, we've been using it for years and now it's the rock star of hops. It brings a refreshing, citrus, pine tree, grapefruit aroma to our beers, open a bottle of Chesterfield Ale and there's no mistaking it. A good tip (for professional brewers) is to contract it from the farmer to ensure you actually will get it! (John Callahan, Brewmaster at [D. G. Yuengling & Son](#))

### Homebrewer's Comments

Cascade hops have a sort of pungent citrus aroma... When I was laying out about 4 oz of cascade for a pale ale once, my wife walked into the office and accused me of having some cannabis somewhere in the room until I showed her the hops. That flavor/aroma carries through a bit, especially if you do late additions and even more so when dry-hopping. I happen to enjoy it quite a bit. Personally, I think it will lean toward citrus with clean fermenting yeasts and seem sort of mango like with the English yeasts I have used 'em with. (snailsongs via [homebrewtalk.com](#))

You know, it's not super sexy like mosaic, Amarillo or Citra. It doesn't pack a huge alpha punch like Simcoe. But you know what? It's the greatest American hop in my mind. All these new hops come and go, they are up, and they are down, but the cascade remains. It's great, versatile hop and if I were stuck on a desert island and could only brew with one hop for the rest of my life, undoubtedly it would be cascade... It's just a fantastic all-around hop. It tastes and

smells amazing and I've just never found a hop I like better. (brewhaha\_rva via [homebrewtalk.com](http://homebrewtalk.com))

**Also Known As:**

**Characteristics:** Floral, with elements of citrus and notes of grapefruit

**Purpose:** Bittering & Aroma

**Alpha Acid: Composition** 4.5%-8.9%

**Beta Acid Composition:** 3.6%-7.5%

**Cohumulone Composition:** 33%-40%

**Country:** US

**Cone Size:** Medium

**Cone Density:** Compact

**Seasonal Maturity:** Mid

**Yield Amount:** 2017-2465 kg/hectare (1800-2200 lbs/acre)

**Growth Rate:** Moderate to high

**Resistant to:**

**Susceptible to:** Some resistance to downy mildew and verticillium wilt

**Storability:** Retains 48%-52% alpha acid after 6 months storage at 20°C (68°F)

**Ease of Harvest:** Difficult

**Total Oil:** 0.8-1.5 mL/100g

**Myrcene Oil:** 45%-60%

**Humulene Oil:** 8%-16%

**Caryophyllene Oil:** 4%-6%

**Farnesene Oil:** 4%-8%

**Substitutes:** Centennial, Amarillo®, Columbus, Ahtanum™

**Style Guide:** Barley Wine, American Pale Ale, Ale, Lager

**References:**

<http://beerlegends.com/cascade-us-hops>

<http://www.inbeertruth.com/2015/07/obituary-jack-horner-father-of-cascade.html>

[https://en.wikipedia.org/wiki/Cascade\\_Range](https://en.wikipedia.org/wiki/Cascade_Range)

[https://www.nass.usda.gov/Statistics\\_by\\_State/Regional\\_Office/Northwest/includes/Publications/Hops/Nat%20Hop%20Rept%202015.pdf](https://www.nass.usda.gov/Statistics_by_State/Regional_Office/Northwest/includes/Publications/Hops/Nat%20Hop%20Rept%202015.pdf)

<https://www.ars.usda.gov/SP2UserFiles/person/2450/hopcultivars/21092.html>

<https://ychops.com/varieties/cascade>

## Centennial

Centennial owes its existence to a mix of Brewer's Gold, Fuggle, East Kent Golding and Bavarian hops. Developed in 1974 and released in 1990, Centennial was pioneered by Charles (Chuck) Zimmerman and S.T. Kenny at Washington State University. Centennial is at times referred to as Super Cascade because of its similar citric characteristic. Centennial is a much-celebrated hop in its versatility with its depth of bitterness and forward aroma – two characteristics that balance each other beautifully. It is well suited to Pale Ales and IPAs with its high alpha content and is floral in both flavor and aroma. Centennial has had its ups and downs in the commercial brewing industry but is currently experiencing a return to popularity, particularly among leading craft breweries.

### Brewmaster's Comments

Centennial has been around for a good long bit and I love it as a "go to". It is just natural, like walking from the woods into a beautiful green field with wild flowers. Earthy yet floral. Nicely balanced with the best of both worlds. It even has a citrus kick to it. Centennial can certainly be tri purpose, flavor and aroma definitely and even for bittering. (Nick Nock, Head Brewer at [SweetWater Brewing Company](#))

Centennial is still a classic workhorse. Great for IPAs and Pales, always pleasing floral and citrus character. (Jeremy S Kosmicki, Brewmaster at [Founders Brewing Co.](#))

[My beers featuring Centennial] are always bright, clean and citrusy. I do like to blend them with Columbus at the very least though because they can be a little one dimensional on their own. (majorvices via [homebrewersassociation.org](#))

Also Known As: Super Cascade

Characteristics: Earthy and floral with an element of citrus

Purpose: Bittering & Aroma

Alpha Acid Composition: 9.5%-11.5%

Beta Acid Composition: 3.5%-4.5%

Cohumulone Composition: 28%-30%

Country: US

Cone Size: Medium

Cone Density: Compact

Seasonal Maturity: Mid

Yield Amount: 1500-1750 kg/hectare (1330-1560 lbs/acre)

Growth Rate: Moderate

Resistant to: prunus necrotic ring-spot virus, downy mildew and verticillium wilt

Susceptible to: hop mosaic virus

Storability Retains: 60%-65% alpha acid after 6 months storage at 20°C (68°F)

Ease of Harvest: Difficult

Total Oil: 1.5-2.5 mL/100g

Myrcene Oil: 45%-55%

Humulene Oil: 10%-18%

Caryophyllene Oil: 5%-8%

Farnesene Oil: 0%-1%

Substitutes: Chinook, Galena, Nugget, Zeus, Columbus, Cascade

Style Guide: Extra Special Bitter, Barley Wine, Imperial Stout, India Pale Ale, Pale Ale

References:

<http://beerlegends.com/centennial-hops>

<https://ychops.com/varieties/centennial>

<http://freshops.com/shop/hop/dual-purpose-hop/centennial-hop/>

<https://www.craftbrewer.com.au/shop/details.asp?PID=603>

[http://schmidthops.com/our\\_hops](http://schmidthops.com/our_hops)

## Chinook

Chinook hops are suitable for any stage of the boil. They're not only a natural for American-style Pale Ales and IPAs, but they also find their way into seasonal ales, barley wine and some porters and stouts. The variety is a cross between Petham Golding and a USDA male and features a piney, spicy bouquet with robust flavors of grapefruit. Released in 1985, Chinook has recently grown in popularity, particularly among craft breweries. Currently, they're commercially featured alone in Stone's Arrogant Bastard and in addition to Cascade and Centennial in Sierra Nevada's Celebration Ale – a brew famous for its piney, citrusy character.

### Homebrewer's Comments

Chinook is one of my favorite hops for bittering and flavor/aroma. My experience with dry hopped chinook beers is that when the beer is young they lend a piney flavor and aroma that is very nice, as the beer ages the piney character fades and it becomes more woody/herbal or even smokey but that's after a year or more. (k1v1116 via [homebrewtalk.com](http://homebrewtalk.com))

Also Known As:

Characteristics: Bouquet of pine and spice

Purpose: Bittering & Aroma

Alpha Acid Composition: 12%-14%

Beta Acid Composition: 3%-4%

Cohumulone Composition: 29%-34%

Country:

Cone Size: Medium

Cone Density: Compact

Seasonal Maturity: Mid to late

Yield Amount: 1700-2230 kg/hectare (1520-2000 lbs/acre)

Growth Rate: Moderate to high

Resistant to:

Susceptible to:

Storability: Retains 68%-70% alpha acid after 6 months storage at 20°C (68°F)

Ease of Harvest: Difficult

Total Oil: 1.5-2.7 mL/100g

Myrcene Oil: 35%-40%

Humulene Oil: 18%-25%

Caryophyllene Oil: 9%-11%

Farnesene Oil: 0%-1%

Substitutes: Galena, Eroica, Nugget, Bullion, Columbus, Northern Brewer, Target

Style Guide: Winter Ale, Pale Ale, India Pale Ale, Porter, Stout, Lager, Barley Wine, American Lager, American Ale

References:

[http://www.brew365.com/hops\\_chinook.php](http://www.brew365.com/hops_chinook.php)

<https://ychhops.com/varieties/chinook>

<http://beerlegends.com/chinook-hops>

<http://freshops.com/shop/hop/bittering-hop/chinook-hop/>

<https://www.craftbrewer.com.au/shop/details.asp?PID=606>

## Comet

Comet has an intriguing parentage of English Sunshine and a native American hop, bringing out a “wild American” flavor. Released in 1974 by the USDA, Comet was originally bred to address the needs for higher alpha hops. Today, it is no longer in commercial production and is somewhat difficult to find. Comet’s flavor profile rests heavily on a strong accent of grapefruit. It does feature solid bittering capabilities and traditionally brewers considered it best suited as a bittering agent for American-style lagers. Recently however, there has been a surge in its use as a dry-hop in ales and IPA’s.

## Homebrewer’s Comments

Bought a pound last year and it was my favorite hop. Hoping that pellets get released by HD soon. Made a comet only pale ale and the flavor is straight grapefruit juice. I mean strong ruby red juice. The dankness really didn't come through with dry hopping, just grapefruit. If you're a grapefruit fan then rock it hard and don't be afraid, otherwise use sparingly with other citrus hops because it's pretty intense. Currently conditioning a comet dry hopped sour that's got the same grapefruit flavor. I'm a fan. (pohldogg via [homebrewtalk.com](http://homebrewtalk.com) )

This is an older variety that originally was largely ignored because people didn't like dank resinous flavors in their beers. Now its gaining popularity. Strong grapefruit zest flavor but extremely pungent aroma of dank resin with a touch of citrus. I love using it as a dry hop in my black IPAs. (m00ps via email)

Also Known As:

Characteristics: Strong grapefruit, dank resin flavors

Purpose: Bittering & Aroma

Alpha Acid Composition: 9.4%-12.4%

Beta Acid Composition: 3%-6.1%

Cohumulone Composition: 41%

Country: US

Cone Size:

Cone Density:

Seasonal Maturity: Late

Yield Amount: 1900-2240 kg/hectare (1700-2000 lbs/acre)

Growth Rate: Very high

Resistant to: verticillium wilt

Susceptible to: downy mildew

Storability: Retains 49% alpha acid after 6 months storage at 20°C (68°F)

Ease of Harvest:

Total Oil: 1.98 mL/100g  
Myrcene Oil: 67%  
Humulene Oil: 1%  
Caryophyllene Oil: 10%  
Farnesene Oil: 0.1%  
Substitutes: Galena, Summit™  
Style Guide: Lager, American Ale, India Pale Ale, Ale  
References: <http://www.homebrewtalk.com/wiki/index.php/Comet>  
<https://www.hopunion.com/comet/>  
<http://dangerousmanbrewing.com/beers/single-hop-ser?ParentPageID=4>

## Crystal

Despite a relatively low yield, Crystal's has made it a fairly popular hop. It's woody, green, floral and fruity with herb and spice notes of cinnamon, nutmeg and black pepper. Extremely versatile, it's even used for its notable aromatic qualities in IPAs and Bitters despite its low alpha acid content. First bred in 1983, it has an interesting lineage with roots extending back to Hallertau, Cascade, Brewer's Gold and Early Green. Commercially it is used in a great variety of beers from Rogue Brutal Bitters to Mountain Sun's Belgian Dip Chocolate Stout.

### Homebrewer's Comments

I use a lot of crystal hops. I like them a lot. They are kinda like a slightly lemony version of Hallertauer hops. I also used them once in an all FWH kolsch and I thought it was fantastic. It was easily one of the best kolsches I ever made. (majorvices via [homebrewersassociation.org](http://homebrewersassociation.org))

Also Known As:

Characteristics: Woody, floral and fruity with spice notes of cinnamon, nutmeg and black pepper

Purpose: Aroma

Alpha Acid Composition: 2.8%-4.4%

Beta Acid Composition: 5.8%-7%

Cohumulone Composition: 21%-26%

Country:

Cone Size:

Cone Density:

Seasonal Maturity: Late

Yield Amount: 2020-2460 kg/hectare (1800-2200 lbs/acre)

Growth Rate: Very high

Resistant to: verticillium wilt

Susceptible to: Moderately susceptible to downy mildew

Storability: Retains 65% alpha acid after 6 months storage at 20°C (68°F)

Ease of Harvest:

Total Oil: 0.82 mL/100g

Myrcene Oil: 47%

Humulene Oil: 26%

Caryophyllene Oil: 7%

Farnesene Oil: Trace Amounts

Substitutes: Liberty, Mount Hood, Hallertau, Ultra, Strisselspalter, Hersbrucker

Style Guide: Bitter, Pilsner, Light Lager, Golden Ale, Nut Brown Ale, Pale Ale, India Pale Ale, Stout, Chocolate Stout, American Lager

References:

<http://beerlegends.com/crystal-hops>

<http://www.ars.usda.gov/SP2UserFiles/person/2450/hopcultivars/21490.html>

## East Kent Golding

East Kent Golding is often thought of as the ultimate English hop. Grown exclusively in Kent, England and descended from Canterbury Whitebine, it is a centuries old variety. Despite claims to the contrary, it is identical to Canterbury Golding. The two names have been used interchangeably for some time with the confusion likely stemming from its namesake. Canterbury is a town in East Kent and the hop was first brought to market there in 1790. Some, however, charge to this day that East Kent Golding and Canterbury Golding are two distinct varieties though there is no clear evidence to support this. The variety began to be known exclusively as East Kent Golding in 1838. It has a good yield in England but has shown to have an even better yield in Oregon after its introduction there in 1994. It has an amazing aroma profile with lavender, spice, honey and notes of thyme. Flavor-wise it is earthy and mildly bittering with a sweet, silky, honey-like character. East Kent Golding is considered to be the quintessential English hop, long held as one of the island's favorites for ales and pale ales.

## Brewmaster's Comments

East Kent Golding is the original hop of the leading style of craft beer, India Pale Ale and is still a great hop after hundreds of years. It's very nostalgic for me, as I "grew up" on British bitters suffused with Fuggle and Golding. Best as a late kettle hop. (Garrett Oliver, Brewmaster at [Brooklyn Brewery](#))

Also Known As: Kent Golding, EKG, Canterbury Golding

Characteristics Aromas of: lavender, spice, honey, thyme, earthy flavors

Purpose: Aroma

Alpha Acid Composition: 5%-6%

Beta Acid Composition: 2%-3%

Cohumulone Composition: 29%

Country:

Cone Size: Large

Cone Density: Loose

Seasonal Maturity: Early

Yield Amount: 640 kg/hectare (570 lbs/acre)

Growth Rate: High

Resistant to: Moderately resistant to downy mildew

Susceptible to: hop mosaic virus

Storability: Retains 78% alpha acid after 6 months storage at 20°C (68°F)

Ease of Harvest:

Total Oil: 0.85 mL/100g

Myrcene Oil 42%

Humulene Oil 27%

Caryophyllene Oil 9%

Farnesene Oil 0%-1%

Substitutes Golding (UK), Whitbread Golding, Progress, Fuggle, First Gold

Style Guide Pale Ale, Extra Special English Ale, English Dark Ale, English Light Ale, Belgian Ale, Christmas Ale

References: <http://beerlegends.com/east-kent-golding-hops>

<http://www.ars.usda.gov/SP2UserFiles/person/2450/hopcultivars/21681.html>

<http://www.ars.usda.gov/SP2UserFiles/person/2450/hopcultivars/21680.html>

## Horizon

Horizon is a versatile hop with some star qualities. Created in Oregon in 1970, Horizon is a diploid hop and half-sister to Nugget. Considered dual-use it has high alpha acids, but also low cohumulone – a trait considered highly favorable when bittering. Its high myrcene and high farnesene content give it some great aroma and flavor notes too, both floral and citrusy. It has been picked up by several craft brewers and is a star at North by Northwest brewery in Austin, Texas where it is used in its top three classic brews, as well as in their specialty beers from time to time.

## Homebrewer's Comments

I used Horizon in an IPA alongside Amarillo. It was a nice combination. Very tropical/citrus, almost like pineapple. (treehousebrewing via [homebrewtalk.com](http://homebrewtalk.com))

Also Known As:

Characteristics: Floral, citrusy

Purpose: Bittering & Aroma

Alpha Acid Composition: 8.8%-16.5%

Beta Acid Composition: 5.5%-8.5%

Cohumulone Composition: 16%-22%

Country: US

Cone Size: Medium

Cone Density: Compact

Seasonal Maturity: Mid to late

Yield Amount: 2017-2241 kg/hectare (1800-2000 lbs/acre)

Growth Rate: Moderate to high

Resistant to: verticillium wilt

Susceptible to: downy mildew

Storability: Retains 80%-85% alpha acid after 6 months storage at 20°C (68°F)

Ease of Harvest: Difficult

Total Oil: 0.5-2 mL/100g

Myrcene Oil: 45%-70%

Humulene Oil: 8%-20%

Caryophyllene Oil: 8%-14%

Farnesene Oil: 3%-5%

Substitutes: Hallertauer Magnum

Style Guide: Light Ale, Red Ale, Pumpkin Ale

References:

<http://beerlegends.com/horizon-hops>

<https://ychops.com/varieties/horizon>

<https://www.craftbrewer.com.au/shop/details.asp?PID=608>

<http://www.usahops.org/graphics/File/HGA%20BCI%20Reports/Variety%20Manual%207-24-12.pdf>

<http://www.greatlakeshops.com/horizon.html>

## Magnum (US)

Magnum is grown on limited acreage in the US but what is produced has an excellent bittering profile and a nice, hoppy, floral aroma and subtle characters of citrus. Though genetically indistinguishable from the original German Magnum, some subtleties undoubtedly exist through varied growing conditions between the two countries. Both hops however are largely considered to be totally interchangeable. The original German-grown Magnum was released in 1980 and hails from the German Hop Institute in Hull. It is considered to be notably good for strong ales like IPA's and Imperial beers but is also said to shine well in Lagers and Pilsners.

### Homebrewer's Comments

I use Magnum to bitter pretty much all of my Belgian and German style brews, as well as many other styles. It's my go-to bittering hop due to its smoothness and the fact that it's a lot more economical to bitter with higher alpha hops than it is for lower alpha varieties. (LLBeanJ via [homebrewtalk.com](http://homebrewtalk.com))

Avery's Maharaja uses Magnum for flavor if you wanna know what it's like. For bittering it's super squeaky clean. (Saccharomyces via [homebrewtalk.com](http://homebrewtalk.com))

Also Known As: Yakima Magnum

Characteristics: Clean bittering, light citrus flavor

Purpose: Bittering

Alpha Acid Composition: 10%-14%

Beta Acid Composition: 4.5%-7%

Cohumulone Composition: 24%-30%

Country: US

Cone Size:

Cone Density:

Seasonal Maturity:

Yield Amount:

Growth Rate:

Resistant to:

Susceptible to:

Storability:

Ease of Harvest:

Total Oil: 1.9-3.0 mL/100g

Myrcene Oil:

Humulene Oil:

Caryophyllene Oil:

Farnesene Oil:

Substitutes: German Magnum, Horizon, Northdown, Northern Brewer

Style Guide: American Pale Ale, American India Pale, Ale, Strong Ale, American Lager, Lager, Pilsner, India Pale Ale

References:

[http://www.brew365.com/hops\\_magnum.php](http://www.brew365.com/hops_magnum.php)

<http://www.midwestsupplies.com/us-magnum-pellet-hops.html>

<http://www.homebrewtalk.com/showthread.php?t=190388>