



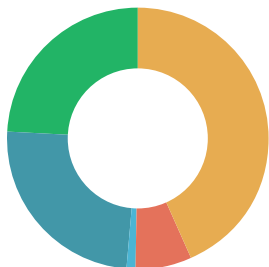
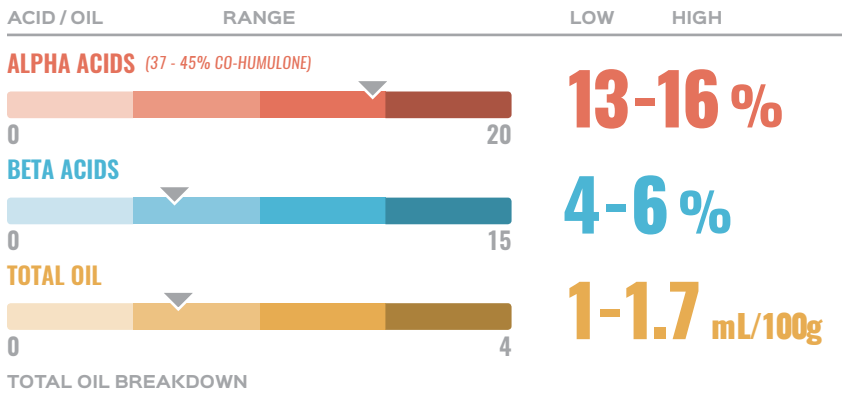
A BITTERING HOP

ADMIRAL

Bred at Wye College and released in 1998, Admiral is a cross between Challenger and Northdown and was designed to be a complement to Target. Its mild aroma characteristics make it suitable for late-hopping and dry hopping applications in combination with other varieties.

COUNTRY: UNITED KINGDOM
AROMA PROFILE: ORANGE, TEA, FRESH, SAP
BEER STYLES: ENGLISH-STYLE ALE, ENGLISH-STYLE BITTER, PALE ALE, IPA, WEISSE

BREWING VALUES:



Myrcene	39 - 48% of total oil
Caryophyllene	6 - 8% of total oil
Farnesene	0 - 2% of total oil
Humulene	23 - 26% of total oil
Other	16 - 32% of total oil



AN AROMA HOP

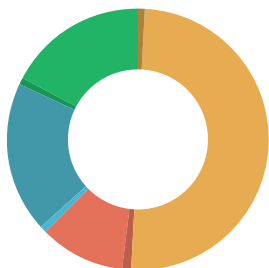
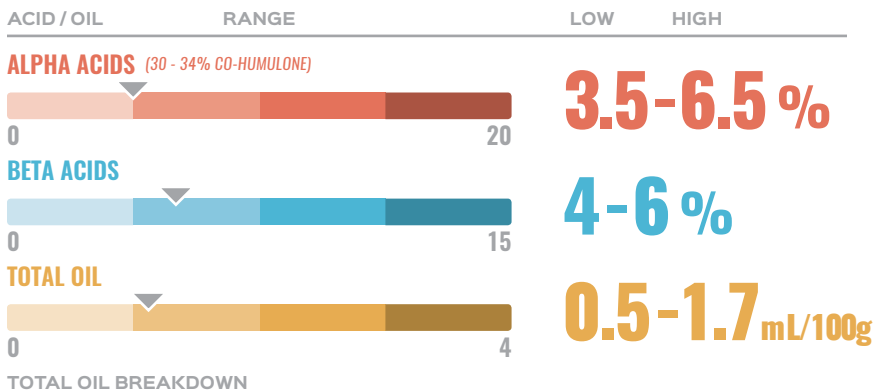
AHTANUM™









YCR 1 CV

Bred by Select Botanicals Group, Ahtanum™ YCR 1 cv. is an aroma-type cultivar used for its aromatic properties and moderate bittering. The variety is named after the location where Charles Carpenter established the first hop farm east of the Cascade Mountains in Washington State in 1869.

COUNTRY: UNITED STATES
AROMA PROFILE: GRAPEFRUIT, GERANIUM
BEER STYLES: LAGER, IPA, PALE ALE

BREWING VALUES:



	B-Pinene	0.6 - 0.9% of total oil
	Myrcene	45 - 55% of total oil
	Linalool	0.4 - 0.6% of total oil
	Caryophyllene	9 - 12% of total oil
	Farnesene	< 1.0% of total oil
	Humulene	15 - 22% of total oil
	Geraniol	0.4 - 0.7% of total oil
	Other	8 - 29% of total oil



AN AROMA HOP

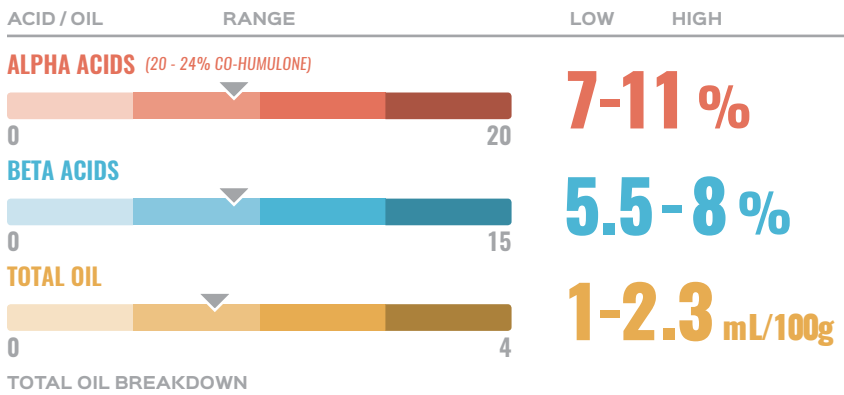
AMARILLO®

VGXP01

Discovered by Virgil Gamache Farms, Amarillo® is one of the top ten aroma varieties utilized by craft brewers. It features relatively high alpha acids along with extremely high levels of myrcene for citrus and grapefruit flavors.

COUNTRY: UNITED STATES
AROMA PROFILE: GRAPEFRUIT, ORANGE, LEMON, MELON, APRICOT, PEACH
BEER STYLES: AMERICAN-STYLE ALE, IPA, WHEAT, RED ALE

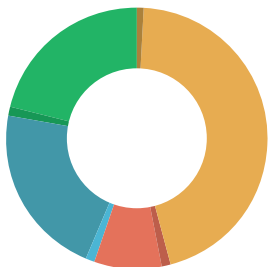
BREWING VALUES:



7-11 %

5.5-8 %

1-2.3 mL/100g



	B-Pinene	0.4 - 0.8% of total oil
	Myrcene	40 - 50% of total oil
	Linalool	0.5 - 0.8% of total oil
	Caryophyllene	7 - 10% of total oil
	Farnesene	6 - 9% of total oil
	Humulene	19 - 24% of total oil
	Geraniol	0.1 - 0.3% of total oil
	Other	5 - 27% of total oil

AN AROMA HOP

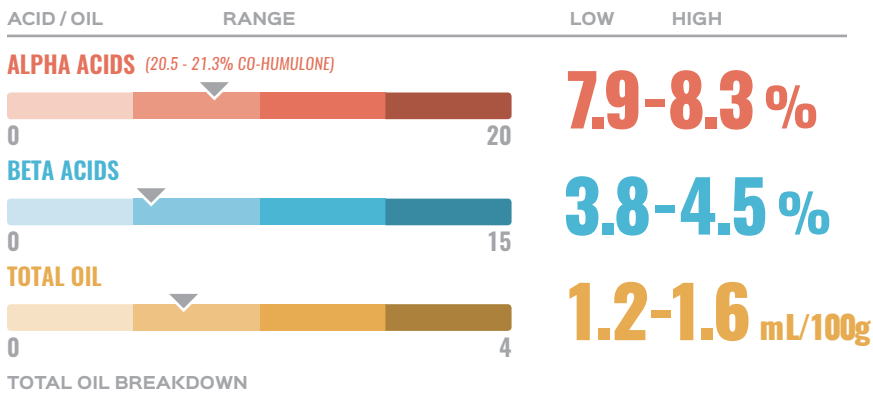
ARAMIS



Developed in 2002 as a cross between French Strisselspalt and UK WGV, Aramis is an aroma variety with sweet and spicy characteristics. It resembles Strisselspalt, but contains higher oil and alpha content.

COUNTRY: FRANCE
AROMA PROFILE: GREEN, HERBAL, SPICY, CITRUS
BEER STYLES: BELGIAN-STYLE ALE, SAISON, PALE ALE, PORTER

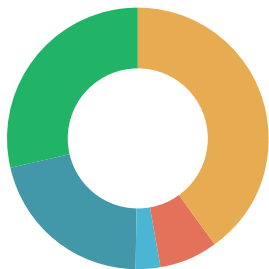
BREWING VALUES:








7.9-8.3%

3.8-4.5%

1.2-1.6 mL/100g



	Myrcene	40% of total oil
	Caryophyllene	7.4% of total oil
	Farnesene	2 - 4% of total oil
	Humulene	21% of total oil
	Other	27.6 - 29.6% of total oil



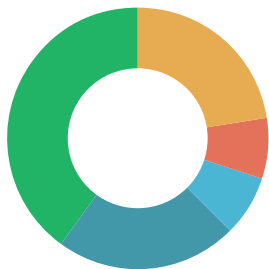
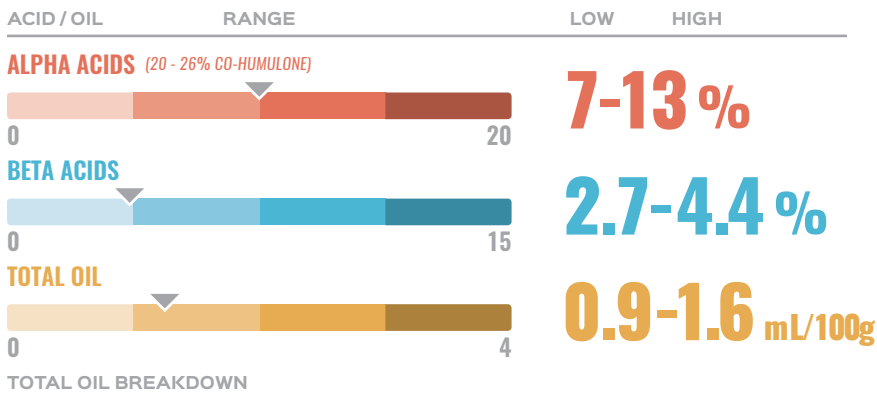
A DUAL PURPOSE HOP

AURORA

A diploid hybrid of Northern Brewer and a TG seedling of unknown origin, Aurora displays an intense yet pleasant aroma in finished beers. It is also known as Super Styrian.

COUNTRY: **SLOVENIA**
AROMA PROFILE: **NOBLE**
BEER STYLES: **ENGLISH-STYLE ALE,**
BELGIAN-STYLE ALE

BREWING VALUES:



	Myrcene	20 - 25% of total oil
	Caryophyllene	6 - 9% of total oil
	Farnesene	5 - 10% of total oil
	Humulene	20 - 25% of total oil
	Other	31 - 49% of total oil



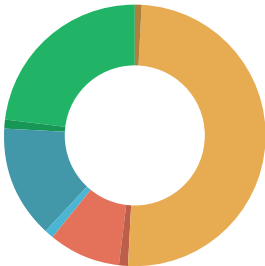
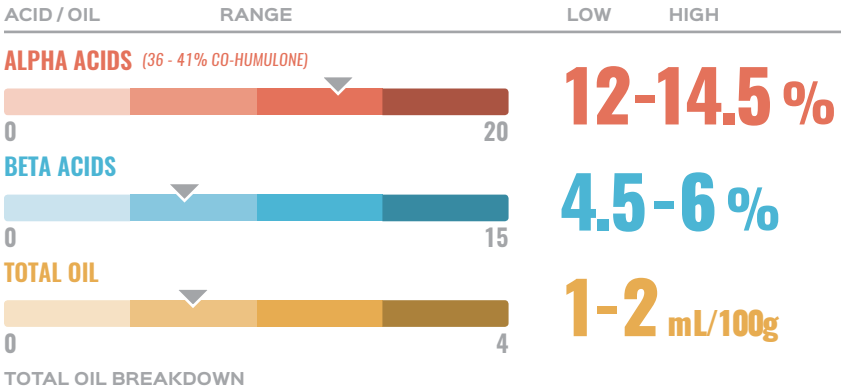
A DUAL PURPOSE HOP









BITTER GOLD

Released in 1999, Bitter Gold is a high alpha variety with excellent aroma capabilities. Its lineage includes Brewer's Gold, Bullion, Comet and Fuggie. Bitter Gold offers limited aroma when used as a bittering hop but delivers diverse stone and tropical fruit flavors in later additions.

COUNTRY: UNITED STATES
AROMA PROFILE: PEAR, WATERMELON, STONE FRUIT, FRESH CUT GRASS
BEER STYLES: BELGIAN-STYLE ALE, PALE ALE, IPA

BREWING VALUES:



	B-Pinene	0.6 - 0.9% of total oil
	Myrcene	45 - 55% of total oil
	Linalool	0.4 - 0.7% of total oil
	Caryophyllene	7 - 11% of total oil
	Farnesene	< 1.0% of total oil
	Humulene	10 - 18% of total oil
	Geraniol	0.1 - 0.3% of total oil
	Other	13 - 36% of total oil



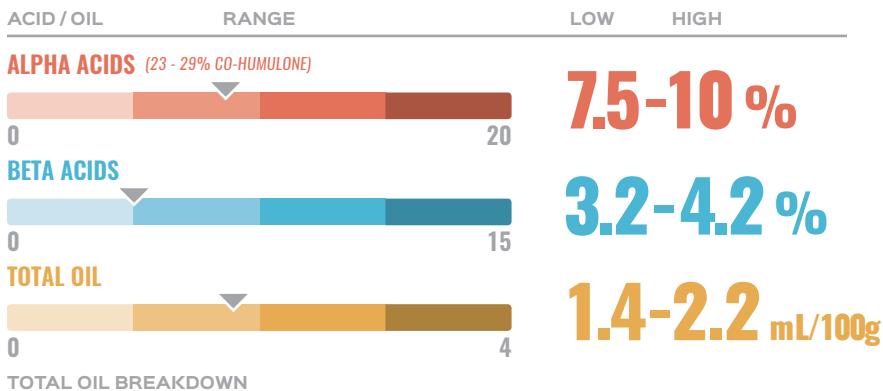
A DUAL PURPOSE HOP

BOADICEA

Bred at Wye College and released in 2004, Boadicea is a dwarf variety derived from open pollination of a second-generation wild, Japanese female hop. Its aroma is very mild with subtle grass, floral and fruit characteristics.

COUNTRY: UNITED KINGDOM
AROMA PROFILE: FLORAL, ORCHARD BLOSSOM, RIPE FRUIT
BEER STYLES: PILSNER

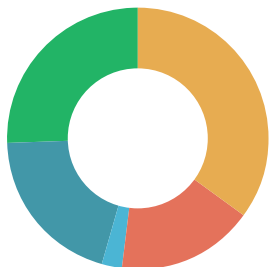
BREWING VALUES:



7.5-10%

3.2-4.2%

1.4-2.2 mL/100g



	Myrcene	30 - 40% of total oil
	Caryophyllene	15 - 19% of total oil
	Farnesene	0 - 5% of total oil
	Humulene	20% of total oil
	Other	16 - 35% of total oil



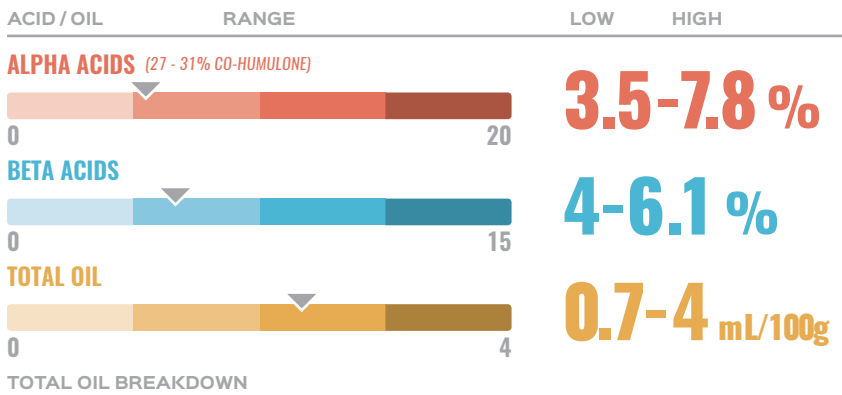
AN AROMA HOP

BOBEK

A diploid hybrid of Northern Brewer and a TG seedling of unknown origin, Bobek displays an intense yet pleasant aroma in finished beers.

COUNTRY: **SLOVENIA**
AROMA PROFILE: **NOBLE**
BEER STYLES: **ENGLISH-STYLE ALE, LAGER, PILSNER, ENGLISH-STYLE BITTER**

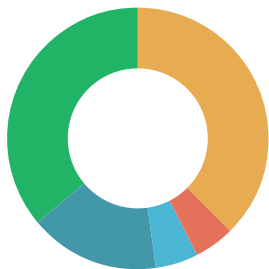
BREWING VALUES:



3.5-7.8 %

4-6.1 %

0.7-4 mL/100g



	Myrcene	30 - 45% of total oil
	Caryophyllene	4 - 6% of total oil
	Farnesene	4 - 7% of total oil
	Humulene	13 - 19% of total oil
	Other	23 - 49% of total oil

AN AROMA HOP

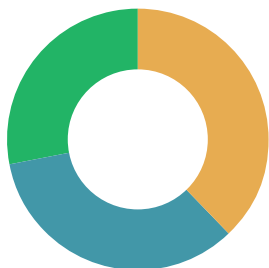
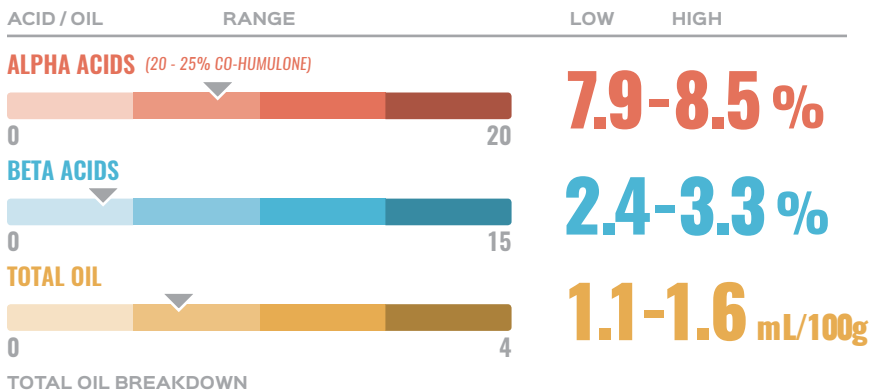
BOUCLIER



Developed in 2005 as a cross between Strisselspalt and a UK male, Bouclier is the most recent release from the French varietal research program. Its UK lineage includes Wye Challenger, Early Bird Golding and Northern Brewer. Bouclier's combination of French and English aromas allows it to bring a French touch to English-style beers.

COUNTRY: FRANCE
AROMA PROFILE: HERBAL, GRASS, SPICY
BEER STYLES: SAISON, STOUT, PILSNER, LAGER

BREWING VALUES:



Myrcene	38% of total oil
Humulene	34% of total oil
Other	28% of total oil



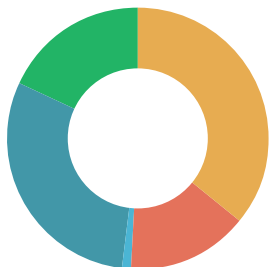
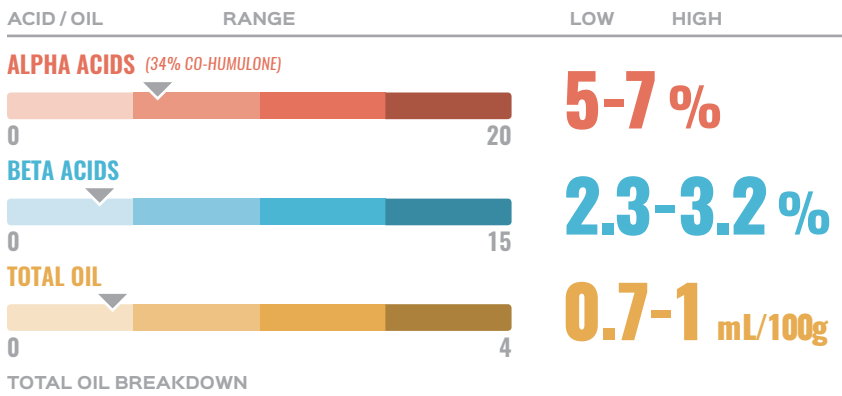
AN AROMA HOP

BRAMLING CROSS

Bred at Wye College in 1927, Bramling Cross is a cross between Bramling (a traditional Golding variety) and a male seedling of the Manitoban wild hop. It is often used in traditional cask conditioned beers due to its distinct characteristics.

COUNTRY: UNITED KINGDOM
AROMA PROFILE: BLACKCURRANT, LOGANBERRY, VANILLA
BEER STYLES: ENGLISH-STYLE BITTER, BROWN ALE, PORTER, BLACK ALE, DUNKEL

BREWING VALUES:



Myrcene	36% of total oil
Caryophyllene	15% of total oil
Farnesene	< 1.0% of total oil
Humulene	30% of total oil
Other	18 - 33% of total oil



A BITTERING HOP

BRAVO™

Developed by Hopsteiner Breeding Program and released in 2006, Bravo™ is a second generation super-alpha variety. It is an excellent bittering variety and can provide pleasant fruit and sweet floral aroma characteristics in some applications.

COUNTRY: UNITED STATES
AROMA PROFILE: ORANGE, VANILLA
BEER STYLES: PALE ALE, IPA, BARLEY WINE

BREWING VALUES:

ACID / OIL

RANGE

LOW

HIGH

ALPHA ACIDS (28 - 35% CO-HUMULONE)



15-18 %

BETA ACIDS



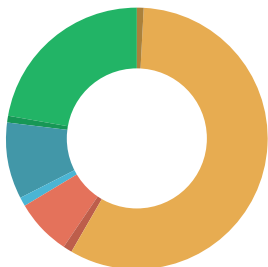
3.5-5.5 %

TOTAL OIL



2.3-3.5 mL/100g

TOTAL OIL BREAKDOWN



B-Pinene	0.8 - 1.0% of total oil
Myrcene	55 - 60% of total oil
Linalool	0.4 - 0.6% of total oil
Caryophyllene	6 - 8% of total oil
Farnesene	< 1.0% of total oil
Humulene	8 - 11% of total oil
Geraniol	0.7 - 0.9% of total oil
Other	18 - 28% of total oil

AN AROMA HOP

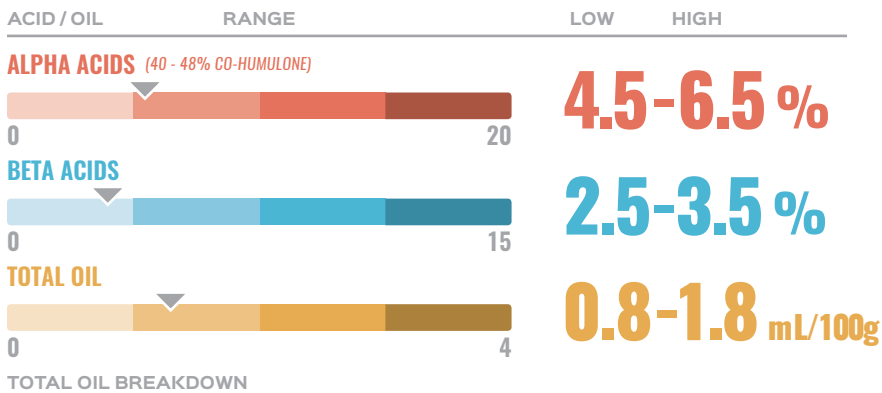
BREWER'S GOLD



Bred circa 1917 and first produced in 1919, Brewer's Gold is one of the first varieties to emerge from a UK breeding program by professor E.S. Salmon. It is an open pollinated seedling of a wild Manitoba hop. Brewer's Gold has a high resin content and provides well-balanced bitterness which is ideally complemented by late hop additions in lager beers.

COUNTRY: GERMANY
AROMA PROFILE: BLACKCURRANT, SPICY
BEER STYLES: ENGLISH, BELGIAN & GERMAN-STYLE ALES

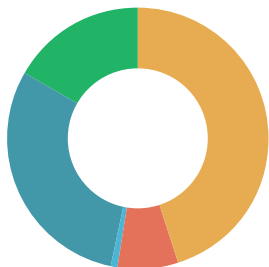
BREWING VALUES:



4.5-6.5 %

2.5-3.5 %

0.8-1.8 mL/100g



Myrcene	40 - 50% of total oil
Caryophyllene	7 - 8% of total oil
Farnesene	< 1.0% of total oil
Humulene	29 - 31% of total oil
Other	10 - 23% of total oil



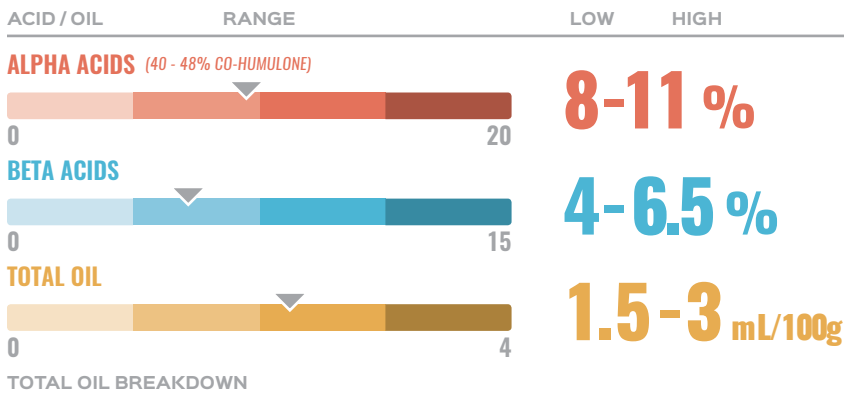
A BITTERING HOP

BREWER'S GOLD

Bred at Wye College in 1919, Brewer's Gold is an ancestor to many major high alpha hops including Sterling, Galena, Horizon, Centennial and Nugget. It is an English variety, however American-grown Brewer's Gold contains higher levels of alpha acids than its English counterpart.

COUNTRY: UNITED STATES
AROMA PROFILE: BLACKCURRANT, SPICY
BEER STYLES: ENGLISH, BELGIAN & GERMAN-STYLE ALES

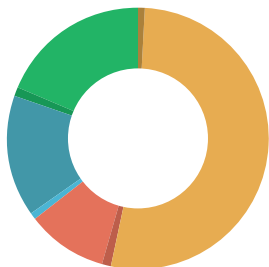
BREWING VALUES:











8-11 %

4-6.5 %

1.5-3 mL/100g



	B-Pinene	0.6 - 0.9% of total oil
	Myrcene	45 - 60% of total oil
	Linalool	0.5 - 0.8% of total oil
	Caryophyllene	8 - 12% of total oil
	Farnesene	< 1.0% of total oil
	Humulene	12 - 18% of total oil
	Geraniol	1.0 - 1.8% of total oil
	Other	6 - 32% of total oil



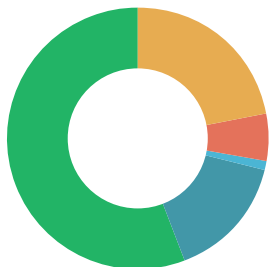
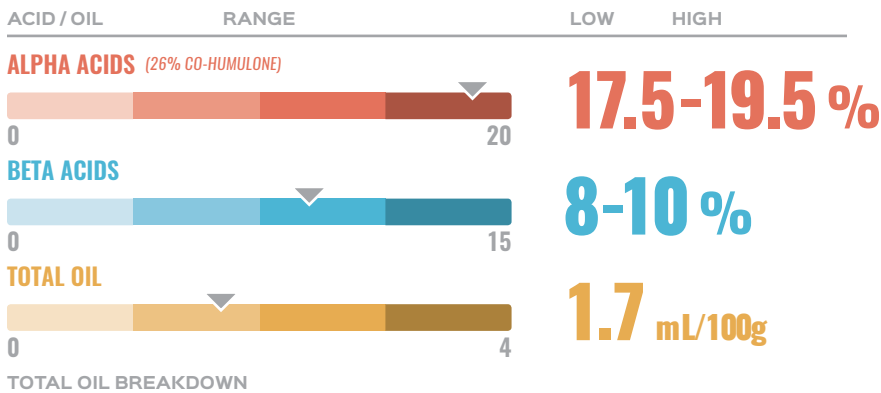
A DUAL PURPOSE HOP

BROOKLYN

Developed by the New Zealand Institute for Plant and Food Research hop breeding program and released in 2015, Brooklyn is a triploid variety from New Zealand Southern Cross and a selected New Zealand male. It is a big hop with high alpha acid content, however, sensory panels have also indicated the presence of grapefruit, tropical fruit and passionfruit characteristics.

COUNTRY: **NEW ZEALAND**
AROMA PROFILE: **GRAPEFRUIT, PASSIONFRUIT, SPICE, SWEET HAY**
BEER STYLES: **IPA, DOUBLE IPA**

BREWING VALUES:



	Myrcene	22.2% of total oil
	Caryophyllene	5.8% of total oil
	Farnesene	0.3% of total oil
	Humulene	15.2% of total oil
	Other	56.5% of total oil



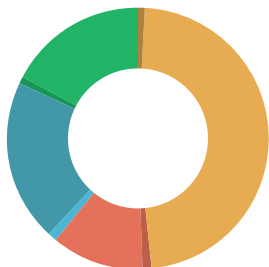
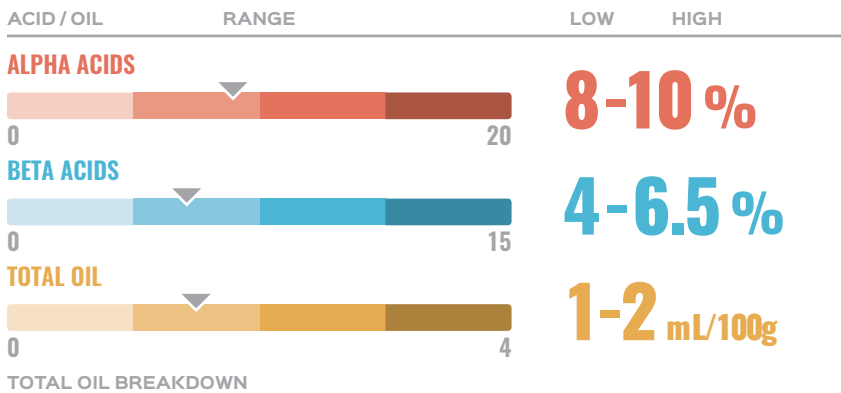
A BITTERING HOP

BULLION

Recognized as one of the first super-alpha varieties, Bullion is a cross between Wild Manitoba BB1 and open pollination of OR. It was a major variety throughout the mid-1940s, however commercial production ceased in 1985 due to newer varieties with higher alpha acid content and better storage stability.

COUNTRY: UNITED STATES
AROMA PROFILE: ZESTY, BLACKCURRANT
BEER STYLES: STOUT, PORTER, DARK LAGER

BREWING VALUES:



	B-Pinene	0.6 - 0.8% of total oil
	Myrcene	40 - 55% of total oil
	Linalool	0.5 - 0.8% of total oil
	Caryophyllene	9 - 14% of total oil
	Farnesene	< 1.0% of total oil
	Humulene	15 - 25% of total oil
	Geraniol	0.1 - 0.3% of total oil
	Other	3 - 34% of total oil



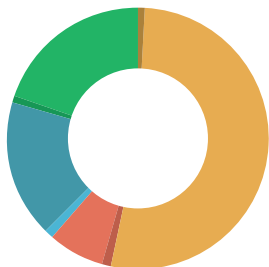
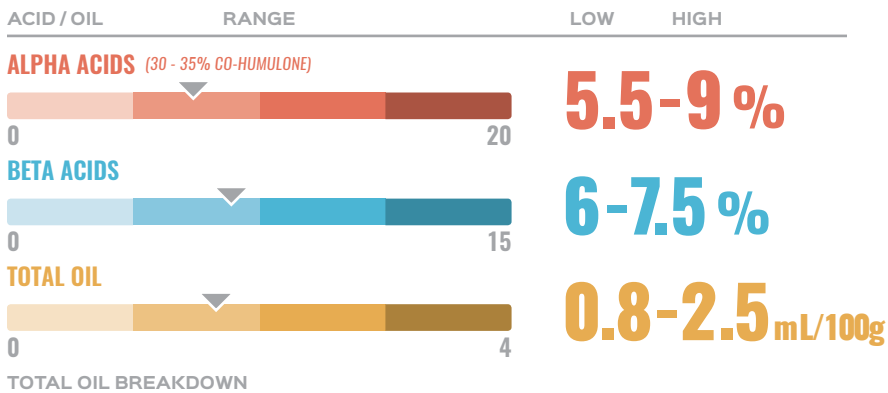
AN AROMA HOP

CASCADE

Originating from the USDA-ARA breeding program, Cascade is an aroma-type cultivar bred in 1956 and released in 1972. It was developed by open pollination of a Fuggle seedling. Cascade is the most popular variety in craft brewing and is known for having a unique floral, spicy and citrus character with balanced bittering potential.

COUNTRY: UNITED STATES
AROMA PROFILE: GRAPEFRUIT, FLORAL
BEER STYLES: AMERICAN-STYLE PALE ALE, AMBER ALE, IPA

BREWING VALUES:



	B-Pinene	0.5 - 0.8% of total oil
	Myrcene	45 - 60% of total oil
	Linalool	0.3 - 0.6% of total oil
	Caryophyllene	5 - 9% of total oil
	Farnesene	6 - 9% of total oil
	Humulene	14 - 20% of total oil
	Geraniol	0.2 - 0.4% of total oil
	Other	< 1% - 29% of total oil



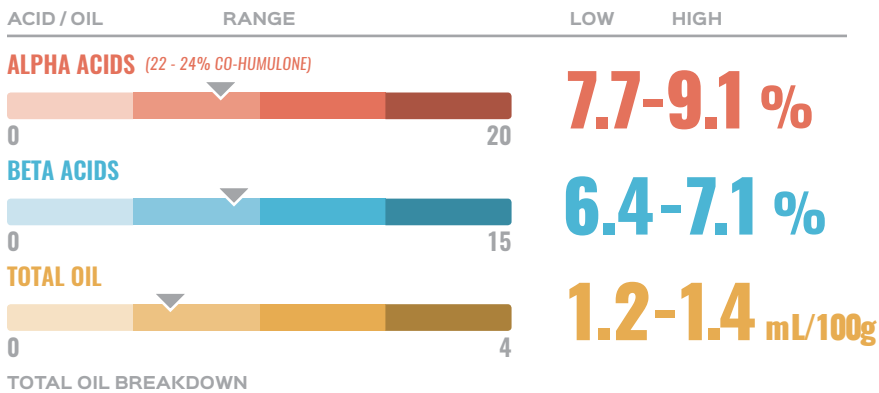
A DUAL PURPOSE HOP

CASHMERE

Released by Washington State University in 2013, Cashmere is a daughter of Cascade, containing Northern Brewer germplasm through the male parent. It contains higher alpha acid content than Cascade and twice as much humulene providing smooth bitterness and a mild citrus fruit aroma.

COUNTRY: UNITED STATES
AROMA PROFILE: MELON, LEMON, LIME, SPICE
BEER STYLES: IPA

BREWING VALUES:



	Myrcene	39 - 42% of total oil
	Caryophyllene	11.5 - 13% of total oil
	Farnesene	< 1.0% of total oil
	Humulene	26 - 29% of total oil
	Other	15 - 23% of total oil



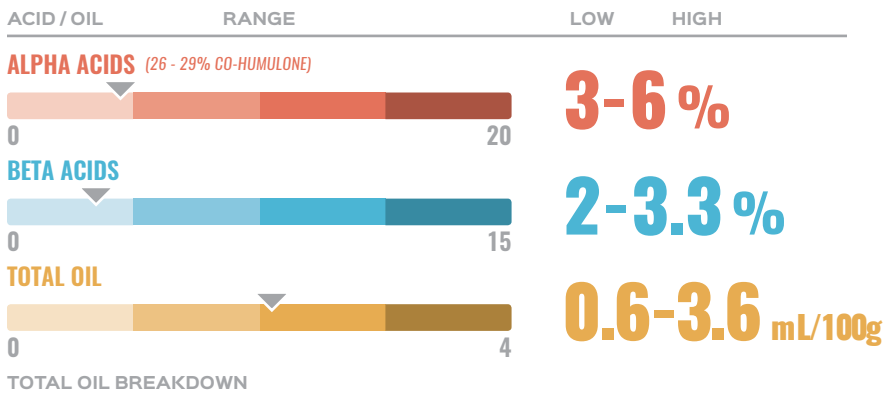
A DUAL PURPOSE HOP

CELEIA

A hybrid of Styrian Golding, Aurora and a Slovenia wild hop, Celeia is known for its noble characteristics. It has widespread usage in lager and ale-style beers.

COUNTRY: SLOVENIA
AROMA PROFILE: NOBLE
BEER STYLES: BELGIAN-STYLE ALE, LAGER, RED ALE

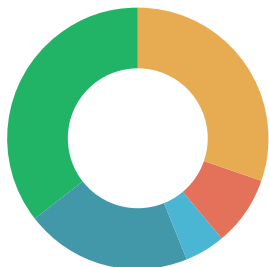
BREWING VALUES:



3-6%

2-3.3%

0.6-3.6 mL/100g



Myrcene	26 - 35% of total oil
Caryophyllene	8 - 9% of total oil
Farnesene	3 - 7% of total oil
Humulene	18 - 23% of total oil
Other	26 - 45% of total oil



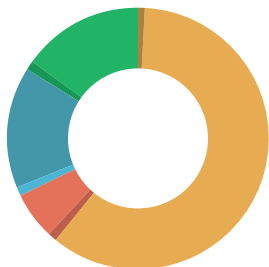
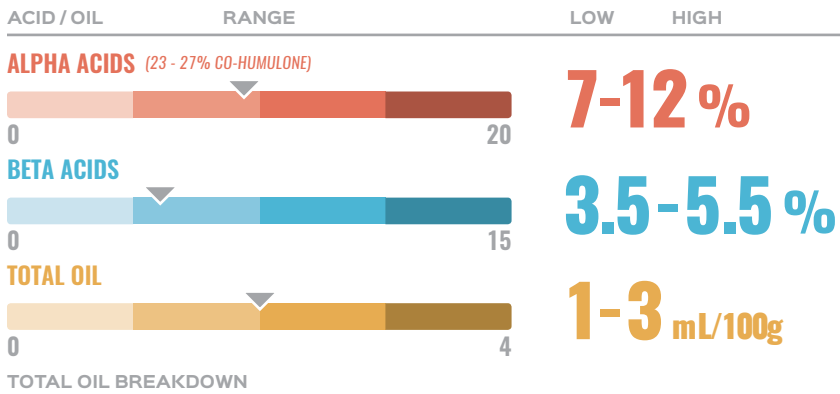
A DUAL PURPOSE HOP

CENTENNIAL

Bred in 1974 and released by Washington State University in 1990, Centennial is an aroma-type cultivar that has found favor as one of the most popular varieties in craft brewing. It is often referred to as a super-Cascade (containing nearly double the alpha content) and can be used for bittering purposes. Centennial is a diploid cross between Brewer's Gold and a USDA male.

COUNTRY: UNITED STATES
AROMA PROFILE: LEMON, FLORAL
BEER STYLES: AMERICAN-STYLE PALE ALE, IPA

BREWING VALUES:



	B-Pinene	0.8 - 1.0% of total oil
	Myrcene	55 - 65% of total oil
	Linalool	0.6 - 0.9% of total oil
	Caryophyllene	5 - 7% of total oil
	Farnesene	< 1.0% of total oil
	Humulene	10 - 20% of total oil
	Geraniol	1.2 - 1.8% of total oil
	Other	3 - 26% of total oil



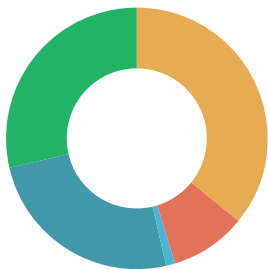
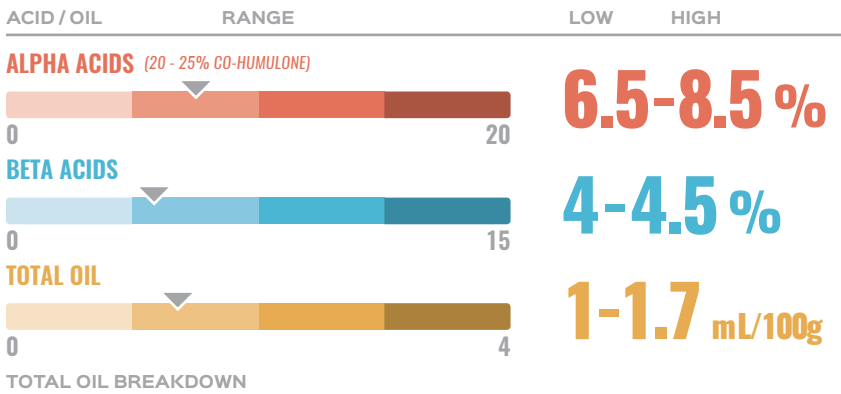
A DUAL PURPOSE HOP

CHALLENGER

Bred at Wye College and introduced in 1972, Challenger is a granddaughter of Northern Brewer and niece of Northdown. It is a versatile variety with wide application in both early and late kettle additions.

COUNTRY: UNITED KINGDOM
AROMA PROFILE: CEDAR, GREEN TEA, SWEET FRUIT
BEER STYLES: ENGLISH-STYLE ALE,
BROWN ALE, PALE ALE

BREWING VALUES:



Myrcene	30 - 42% of total oil
Caryophyllene	~9.5% of total oil
Farnesene	< 1% of total oil
Humulene	~25% of total oil
Other	23 - 69% of total oil



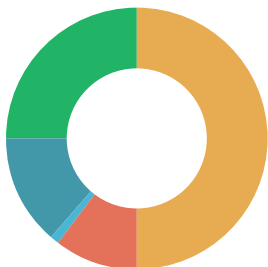
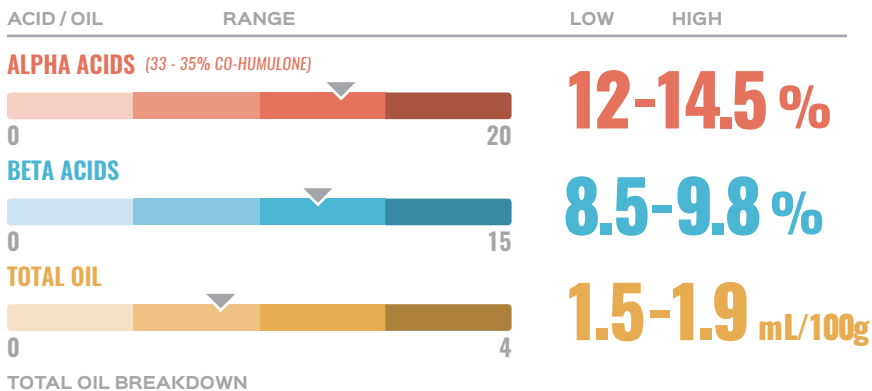
A BITTERING HOP






CHELAN

Developed by John I Haas, Inc. and released in 1994, Chelan is similar to Galena but contains higher alpha acids.

COUNTRY: UNITED STATES
AROMA PROFILE: MILD
BEER STYLES: AMERICAN-STYLE ALE

BREWING VALUES:



	Myrcene	45 - 55% of total oil
	Caryophyllene	9 - 12% of total oil
	Farnesene	< 1.0% of total oil
	Humulene	12 - 15% of total oil
	Other	17 - 33% of total oil



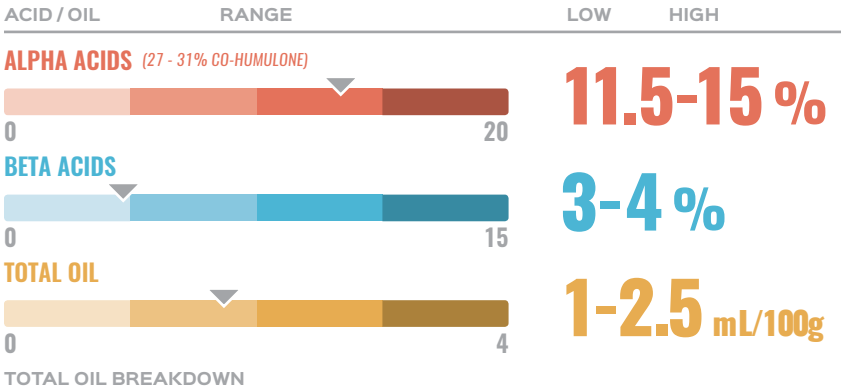
A DUAL PURPOSE HOP

CHINOOK

Developed by the USDA breeding program in Washington State and released in 1985 as a high alpha bittering variety, Chinook is a cross between Petham Golding and a USDA male. In recent years, it has found favor as a dual purpose hop in the craft brewing community as a result of its spice and pine aroma characteristics.

COUNTRY: UNITED STATES
AROMA PROFILE: GRAPEFRUIT, SPICY, PINE
BEER STYLES: IPA, PALE ALE, STOUT, PORTER

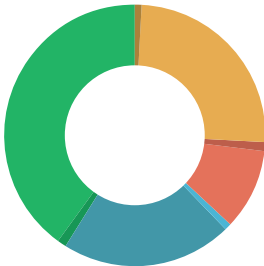
BREWING VALUES:



11.5-15%

3-4%

1-2.5 mL/100g



	B-Pinene	0.3 - 0.5% of total oil
	Myrcene	20 - 30% of total oil
	Linalool	0.3 - 0.5% of total oil
	Caryophyllene	9 - 11% of total oil
	Farnesene	< 1.0% of total oil
	Humulene	18 - 24% of total oil
	Geraniol	0.7 - 1.0% of total oil
	Other	32 - 51% of total oil



AN AROMA HOP

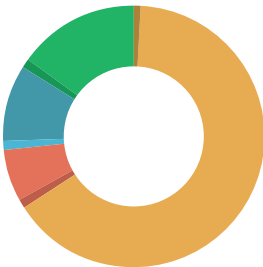
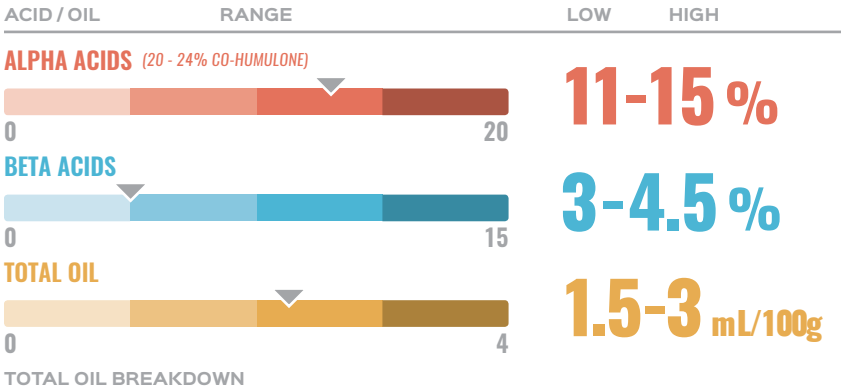
CITRA®

HBC 394 CV

Developed by Hop Breeding Company and released in 2007, Citra® features high alpha acid and total oil content with a low percentage of co-humulone. It is one of the top ten aroma varieties for craft brewers imparting distinct citrus and tropical fruit flavors.

COUNTRY: UNITED STATES
AROMA PROFILE: GRAPEFRUIT, MELON, LIME, GOOSEBERRY, PASSION FRUIT,
BEER STYLES: IPA, PALE ALE

BREWING VALUES:



	B-Pinene	0.7 - 1.0% of total oil
	Myrcene	60 - 70% of total oil
	Linalool	0.6 - 0.9% of total oil
	Caryophyllene	5 - 8% of total oil
	Farnesene	< 1.0% of total oil
	Humulene	7 - 12% of total oil
	Geraniol	0.3 - 0.5% of total oil
	Other	7 - 25% of total oil



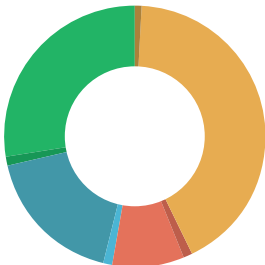
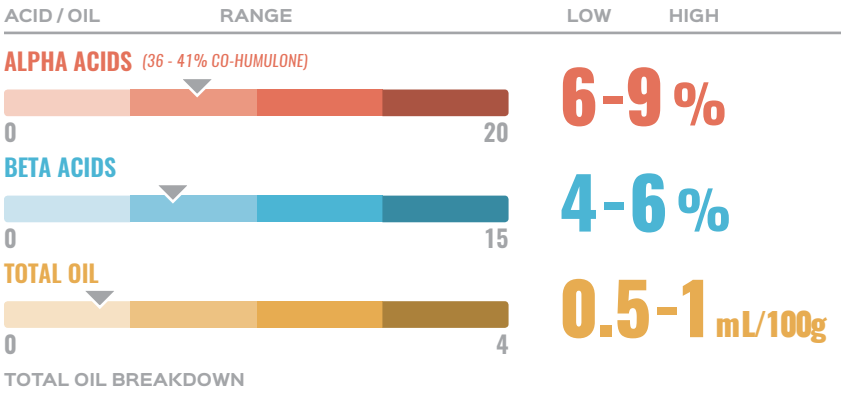
A DUAL PURPOSE HOP

CLUSTER

Cluster is one of the oldest hop varieties grown in the United States and until the late 1970s, accounted for the majority of the country's hop acreage. Its pedigree is unknown, however hybridization of imported varieties and indigenous male hops has been suggested. Cluster is an excellent dual purpose hop and is often used in the reproduction of historical beer styles.

COUNTRY: UNITED STATES
AROMA PROFILE: FLORAL, EARTHY, SWEET FRUIT
BEER STYLES: LAGER, STOUT, PORTER

BREWING VALUES:



	B-Pinene	0.5 - 0.7% of total oil
	Myrcene	38 - 46% of total oil
	Linalool	0.4 - 0.8% of total oil
	Caryophyllene	8 - 10% of total oil
	Farnesene	< 1.0% of total oil
	Humulene	15 - 20% of total oil
	Geraniol	0.6 - 0.9% of total oil
	Other	21 - 37% of total oil



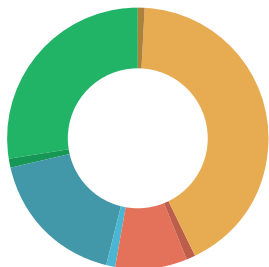
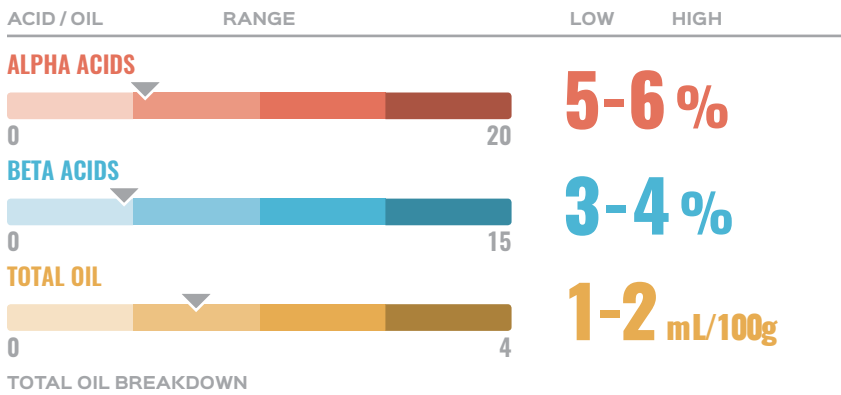
AN AROMA HOP









COLUMBIA

Selected in 1967 at Oregon State University in Corvallis, Oregon, Columbia is a descendant of Fuggle and sister selection of Willamette. Commercial production was discontinued in the early 1980s in favor of Willamette, however small quantities are again being produced.

COUNTRY: UNITED STATES
AROMA PROFILE: FUGGLE TYPE
BEER STYLES: ENGLISH-STYLE ALE

BREWING VALUES:



	B-Pinene	0.6 - 0.8% of total oil
	Myrcene	45 - 55% of total oil
	Linalool	0.2 - 0.5% of total oil
	Caryophyllene	9 - 12% of total oil
	Farnesene	3 - 5% of total oil
	Humulene	15 - 19% of total oil
	Geraniol	0.2 - 0.6% of total oil
	Other	7 - 27% of total oil



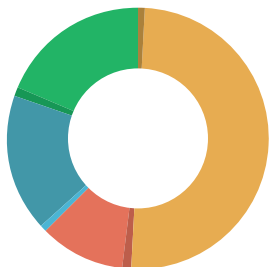
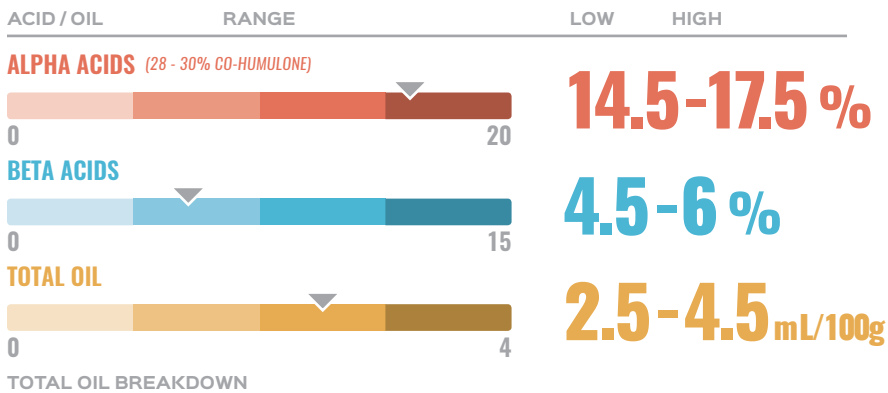
A BITTERING HOP









COLUMBUS

Originally selected by Charles Zimmerman for Hopunion, Inc., Columbus is a descendant of Nugget. It is a high alpha variety and is primarily used for bittering purposes. Columbus is often referred to as CTZ, a trio of similar hops including Tomahawk® and Zeus.

COUNTRY: UNITED STATES
AROMA PROFILE: BLACK PEPPER, LICORICE, CITRUS
BEER STYLES: IPA, IMPERIAL ALE, PALE ALE

BREWING VALUES:



	B-Pinene	0.6 - 1.0% of total oil
	Myrcene	45 - 55% of total oil
	Linalool	0.4 - 0.6% of total oil
	Caryophyllene	6 - 10% of total oil
	Farnesene	< 1.0% of total oil
	Humulene	9 - 14% of total oil
	Geraniol	0.2 - 0.5% of total oil
	Other	18 - 38% of total oil



A BITTERING HOP

COMET

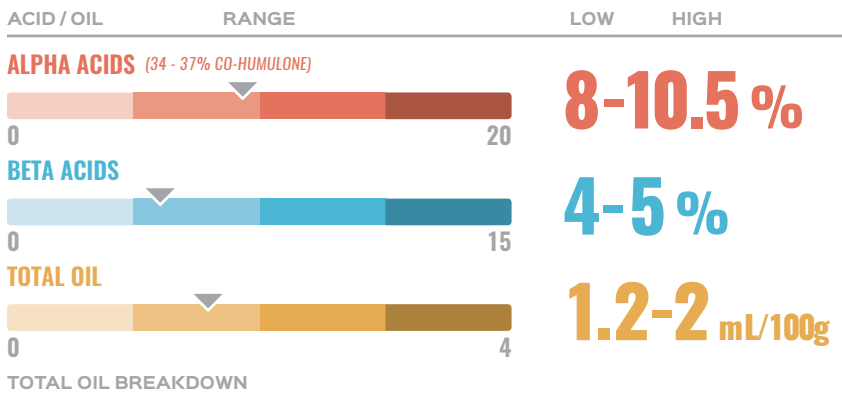
Developed in 1961 and released in 1974 by the USDA, Comet was selected for its high alpha acid content and adaptability to growing conditions in the Yakima Valley. Commercial production ceased in the 1980s in favor of newer super-alpha hops. Comet has made a recent comeback, finding favor in dual purpose applications due to its unique “wild American” aroma.

COUNTRY: UNITED STATES

AROMA PROFILE: “WILD AMERICAN,” GRASS, GRAPEFRUIT

BEER STYLES: ALE, LAGER

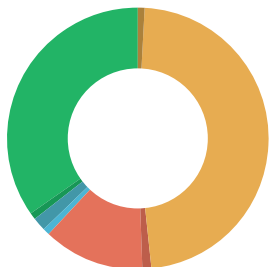
BREWING VALUES:



8-10.5 %

4-5 %

1.2-2 mL/100g



	B-Pinene	0.8 - 1.1% of total oil
	Myrcene	40 - 55% of total oil
	Linalool	0.5 - 0.8% of total oil
	Caryophyllene	10 - 15% of total oil
	Farnesene	< 1.0% of total oil
	Humulene	1 - 2% of total oil
	Geraniol	0.2 - 0.9% of total oil
	Other	24 - 47% of total oil



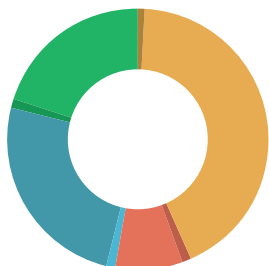
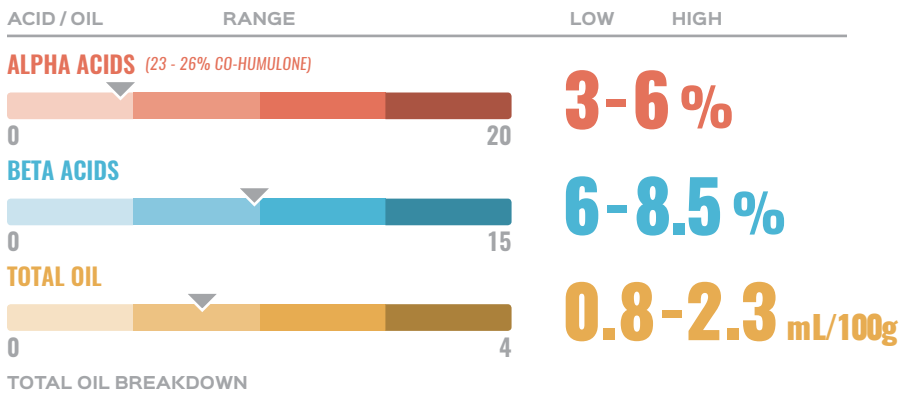
AN AROMA HOP









CRYSTAL

Bred in 1983 by the USDA, Crystal is a triploid aroma-type cultivar from Hallertau Mittelfrüh, Cascade, Brewer's Gold and Early Green. It is primarily grown in Oregon and has become increasingly popular among craft brewers due to its versatility in a variety of beer styles.

COUNTRY: UNITED STATES
AROMA PROFILE: WOODY, GREEN
BEER STYLES: BELGIAN-STYLE ALE, ENGLISH-STYLE BITTER, IPA, KÖLSCH, LAGER, PILSNER

BREWING VALUES:



	B-Pinene	0.4 - 1.0% of total oil
	Myrcene	30 - 55% of total oil
	Linalool	0.6 - 1.0% of total oil
	Caryophyllene	5 - 12% of total oil
	Farnesene	< 1.0% of total oil
	Humulene	20 - 30% of total oil
	Geraniol	0.4 - 0.7% of total oil
	Other	< 1% - 43% of total oil



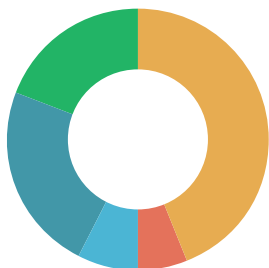
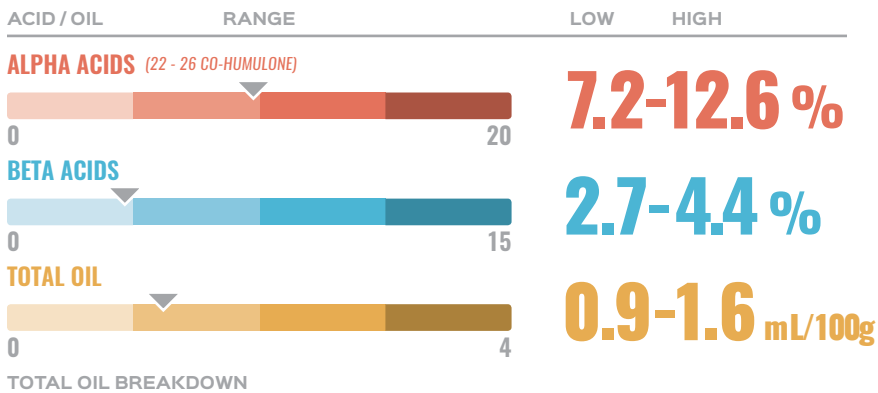
A DUAL PURPOSE HOP

DANA

Developed as a cross between German Magnum and a wild Slovenian male, Dana displays subtle floral and citrus characteristics.

COUNTRY: SLOVENIA
AROMA PROFILE: FLORAL, CITRUS
BEER STYLES: PALE ALE, IPA

BREWING VALUES:



Myrcene	35 - 53% of total oil
Caryophyllene	4 - 8% of total oil
Farnesene	6 - 9% of total oil
Humulene	20 - 27% of total oil
Other	3 - 35% of total oil



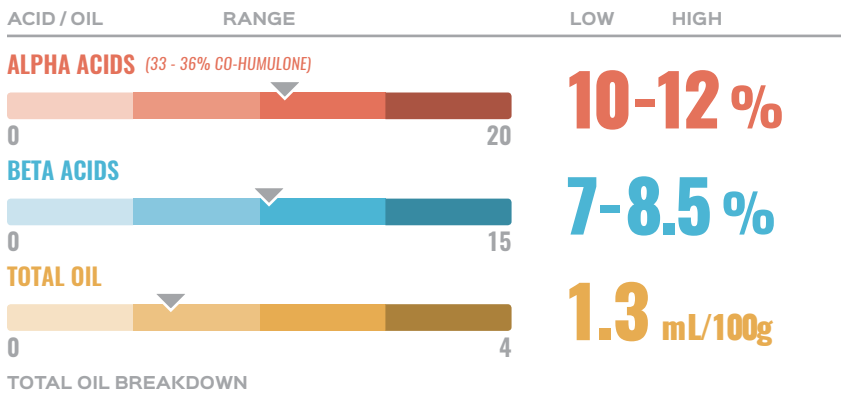
A DUAL PURPOSE HOP

DR. RUDI

Developed at the New Zealand Horticultural Research Centre (now New Zealand Institute for Plant and Food Research) and released in 1976 as "Super Alpha", Dr. Rudi is a triploid variety bred from New Zealand Smoothcone. Its name was changed to Dr. Rudi in 2012. Dr. Rudi works well in single-hopped beers or in conjunction with multiple aroma varieties.

COUNTRY: **NEW ZEALAND**
AROMA PROFILE: **RESIN, PINE, LEMONGRASS**
BEER STYLES: **ALE, LAGER**

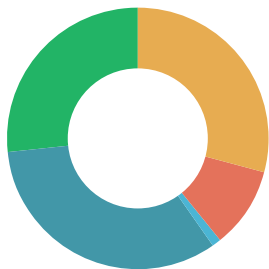
BREWING VALUES:



10-12%

7-8.5%

1.3 mL/100g



	Myrcene	29.2% of total oil
	Caryophyllene	10.1% of total oil
	Farnesene	0.5% of total oil
	Humulene	33.2% of total oil
	Other	27% of total oil



AN AROMA HOP

EAST KENT GOLDING

Developed from wild Canterbury Whitebine and released to market in the late 1700s, East Kent Golding is the quintessential English variety. Its ideal application is late aroma hopping or post-fermentation.

COUNTRY:

UNITED KINGDOM

AROMA PROFILE:

LAVENDER, HONEY, LEMON, THYME, ORANGE, GRAPEFRUIT

BEER STYLES:

PORTER, STOUT, ENGLISH-STYLE ALE

BREWING VALUES:

ACID / OIL

RANGE

LOW

HIGH

ALPHA ACIDS (28 - 32% CO-HUMULONE)



0

20

4.5-6.5 %

BETA ACIDS



0

15

1.9-2.8 %

TOTAL OIL

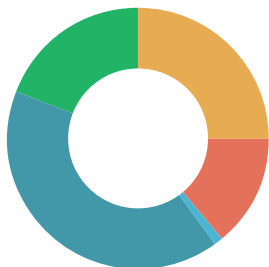


0

4

0.4-0.8 mL/100g

TOTAL OIL BREAKDOWN



Myrcene	30 - 30% of total oil
Caryophyllene	12 - 16% of total oil
Farnesene	< 1.0% of total oil
Humulene	38 - 44% of total oil
Other	9 - 19% of total oil



AN AROMA HOP

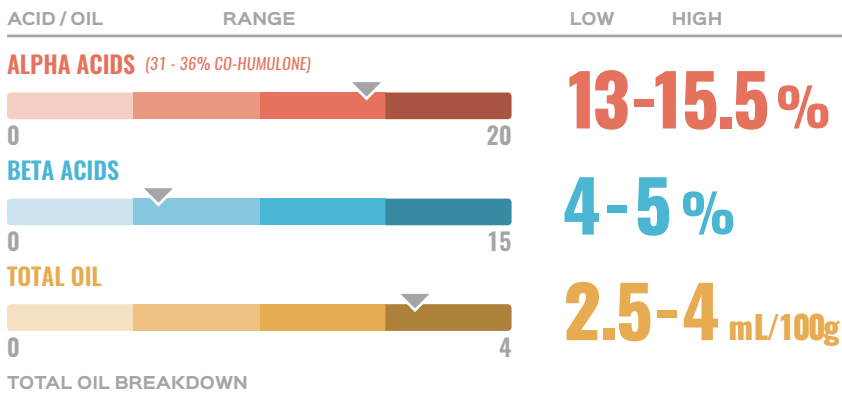
EKUANNOT™

HBC 366 CV.

Developed by Hop Breeding Company and released in 2014, HBC 366 features pronounced aroma characteristics and extremely high oil content. This variety bursts out of the spring soil in vibrant yellow and gradually matures to a deep green color by fall harvest.

COUNTRY: UNITED STATES
AROMA PROFILE: MELON, BERRY, LIME, APPLE, PAPAYA, GREEN PEPPER
BEER STYLES: IPA, AMERICAN-STYLE ALE, BELGIAN-STYLE ALE

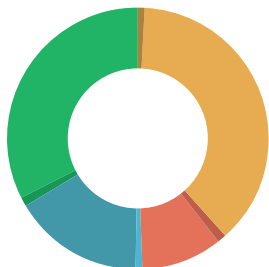
BREWING VALUES:



13-15.5%

4-5%

2.5-4 mL/100g



	B-Pinene	0.4 - 0.8% of total oil
	Myrcene	30 - 45% of total oil
	Linalool	0.2 - 0.5% of total oil
	Caryophyllene	8 - 12% of total oil
	Farnesene	< 1.0% of total oil
	Humulene	12 - 20% of total oil
	Geraniol	0.2 - 0.5% of total oil
	Other	20 - 48% of total oil



A DUAL PURPOSE HOP

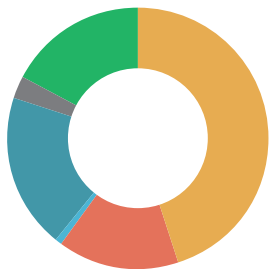
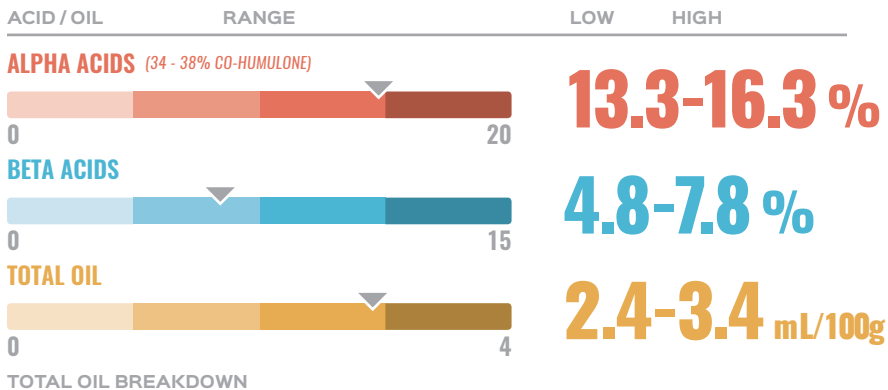
ELLA™

01 - 220 - 060

Bred in 2001 and released in 2007, Ella™ is a half-sister to Galaxy™ and daughter of male parent Spalt. It is reminiscent of a noble variety in lower doses, but imparts strong tropical fruit flavors in larger additions.

COUNTRY: AUSTRALIA
AROMA PROFILE: FLORAL, NOBLE, SPICY,
STAR ANISE, GRAPEFRUIT
BEER STYLES: LAGER, PILSNER

BREWING VALUES:



Myrcene	40 - 50% of total oil
Caryophyllene	12 - 18% of total oil
Farnesene	< 1.0% of total oil
Humulene	16 - 22% of total oil
Other	5 - 29% of total oil
Selinene	2 - 4% of total oil



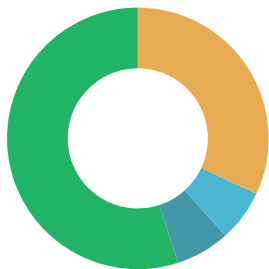
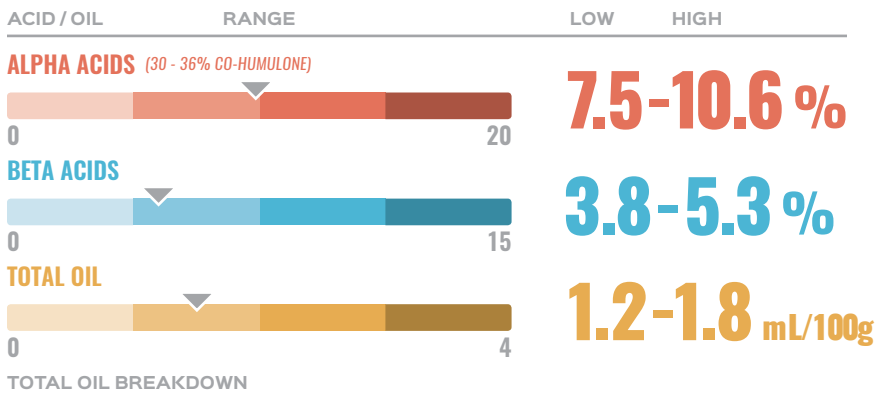
A DUAL PURPOSE HOP

ENDEAVOUR

Bred in 2002 at Wye College, Endeavour is a seedling of Cascade and granddaughter of Target. It provides a unique English flavor with notable citrus and red-fruit flavors.

COUNTRY: UNITED KINGDOM
AROMA PROFILE: BLACKCURRANT, LOGANBERRY, SPICE, GRAPEFRUIT, LIME
BEER STYLES: ENGLISH-STYLE ALE, LAGER

BREWING VALUES:



	Myrcene	27 - 37% of total oil
	Farnesene	5 - 8% of total oil
	Humulene	3 - 10% of total oil
	Other	45 - 65% of total oil



A DUAL PURPOSE HOP

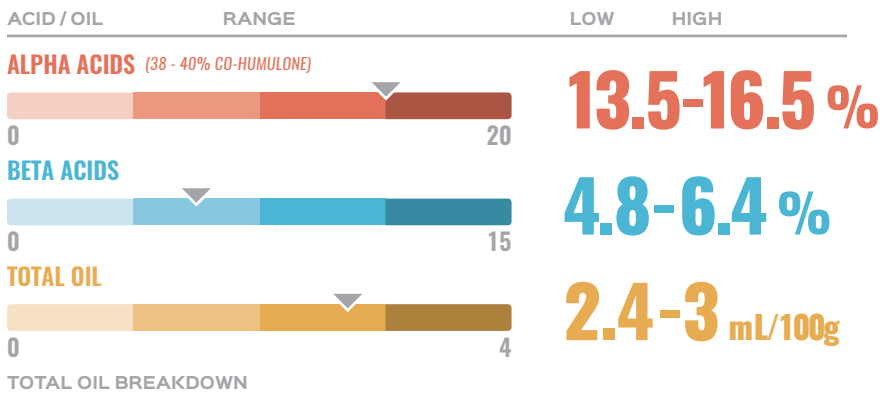
ENIGMA™

02-016-008

Expanded in 2013, Enigma™ is one of the newest Australian hops. It is a descendant of Swiss Tettnang, but offers many more diverse flavors than its heritage would suggest. Enigma™ is an excellent choice for late additions and dry hop applications.

COUNTRY: AUSTRALIA
AROMA PROFILE: PINOT GRIS, RASPBERRY, REDCURRANT, TROPICAL FRUIT
BEER STYLES: PALE ALE, IPA, AMBER ALE

BREWING VALUES:





AN AROMA HOP

EPIC

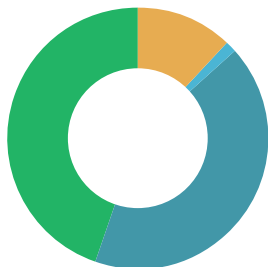
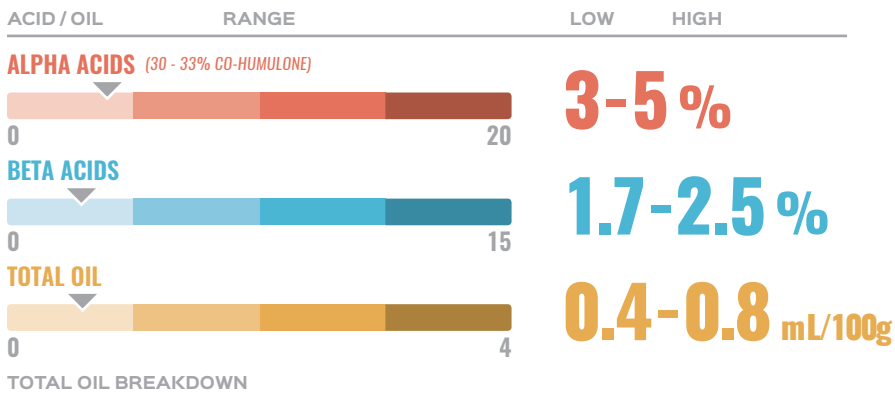
Found as a chance seedling in 1987 and grown as an ornamental garden plant until 2004, Epic was expanded for commercial production in winter 2014-2015. The history of the field, combined with the oil composition of Epic, strongly suggests that the lineage includes Alliance hops. Early brewing experience indicated medium intensity, deep fruit and berry-like aromas without any citrus or floral notes. Epic is an excellent late aroma hop.




COUNTRY: UNITED KINGDOM

AROMA PROFILE: FRUITY, BERRY

BEER STYLES: PALE ALE

BREWING VALUES:



	Myrcene	~12% of total oil
	Farnesene	~1.5% of total oil
	Humulene	~42% of total oil
	Other	44.5% of total oil



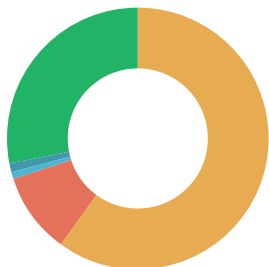
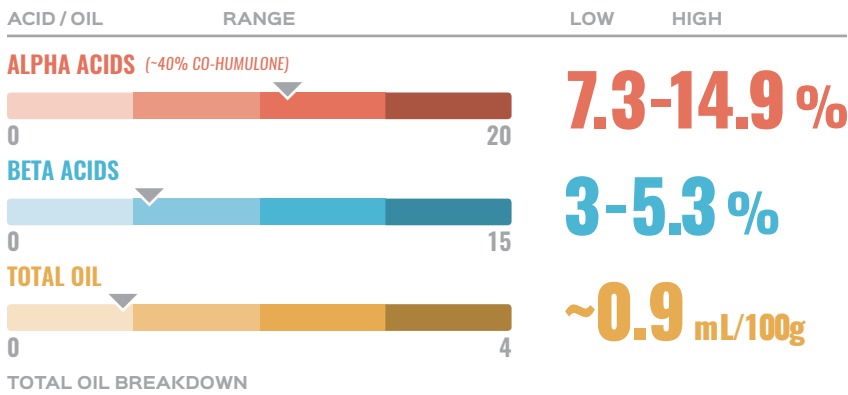
A BITTERING HOP

EROICA

Released by the Idaho Agricultural Experiment Station, Oregon Agricultural Experiment Station, and USDA-ARS in 1982, Eroica is an open pollinated cross of Brewer's Gold. It is primarily a bittering hop, however some brewers have noted fruit forward flavors in late applications.

COUNTRY: UNITED STATES
AROMA PROFILE: FRUITY
BEER STYLES: PALE ALE, AMBER ALE, PORTER, ENGLISH-STYLE BITTER

BREWING VALUES:



Myrcene	55 - 65% of total oil
Caryophyllene	7 - 13% of total oil
Farnesene	< 1.0% of total oil
Humulene	< 1.0% of total oil
Other	20 - 37% of total oil



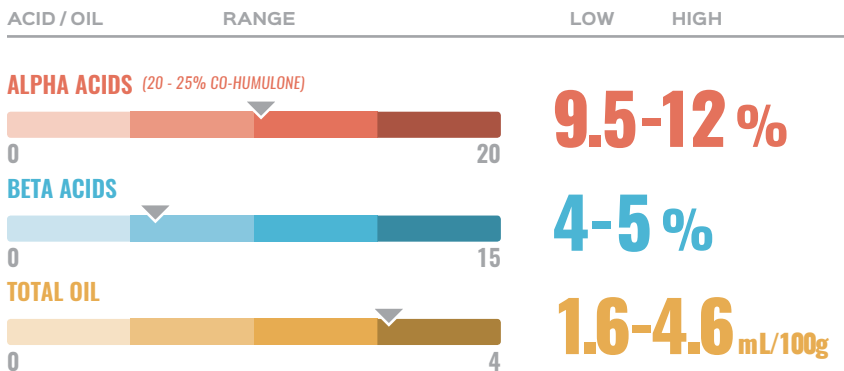
A PELLET BLEND

FALCONER'S FLIGHT®

Developed in honor of Northwest brewing legend, Glen Hay Falconer, Falconer's Flight® is a complex combination comprised of the most unique hop varieties and additional experimental hops. Falconer's Flight® delivers a bold aroma profile with distinct tropical, citrus, floral, lemon and grapefruit characteristics. A portion of the proceeds from each Falconer's Flight® purchase is donated to the Glen Hay Falconer Foundation to support brewing scholarships for professional and aspiring brewers.

COUNTRY: UNITED STATES
AROMA PROFILE: LEMON, GRAPEFRUIT
BEER STYLES: IPA, PALE ALE

BREWING VALUES:





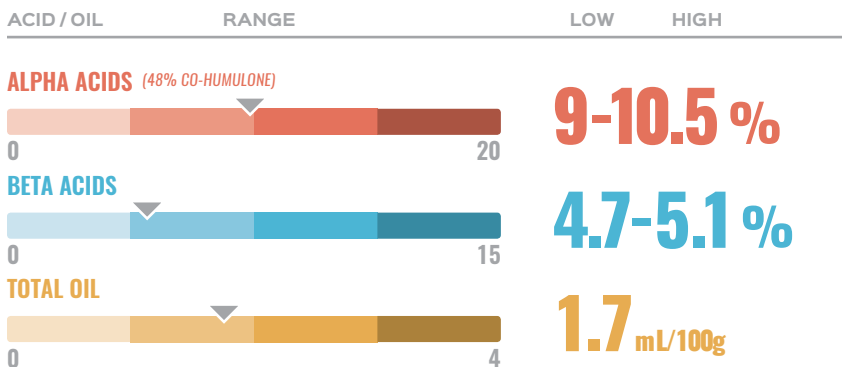
A PELLET BLEND

FALCONER'S FLIGHT® 7Cs

This proprietary pellet blend combines seven “C” hops and additional experimental varieties. Like its predecessor, 7Cs delivers strong fruit and citrus characteristics, but is layered with additional spicy, earthy overtones that allow it to function as the perfect addition to American-style ales.

COUNTRY: UNITED STATES
AROMA PROFILE: FRUIT, CITRUS, SPICE, EARTH
BEER STYLES: AMERICAN-STYLE ALE, IPA,
IMPERIAL IPA, PALE ALE

BREWING VALUES:



9-10.5 %

4.7-5.1 %

1.7 mL/100g



A DUAL PURPOSE HOP

FIRST GOLD

Bred at Wye College in 1995, First Gold is a cross between WGV (Whitbread Golding Variety) and a dwarf male. It features many of the flavor characteristics of WGV and has found favor in both general kettle and late or dry hopping applications.

COUNTRY: UNITED KINGDOM
AROMA PROFILE: GERANIUM, MAGNOLIA, APRICOT, TANGERINE, ORANGE MARMALADE
BEER STYLES: BELGIAN-STYLE BLONDE, BITTER, ENGLISH-STYLE ALE, SAISON BIÈRE DE GARDE

BREWING VALUES:

ACID / OIL RANGE LOW HIGH

ALPHA ACIDS (32 - 34% CO-HUMULONE)



5.6-9.3%

BETA ACIDS



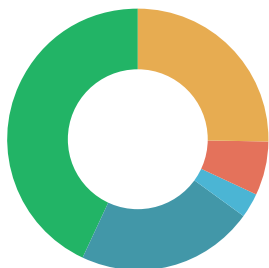
2.3-4.1%

TOTAL OIL



0.7-1.5 mL/100g

TOTAL OIL BREAKDOWN



Myrcene	24 - 27% of total oil
Caryophyllene	6 - 7% of total oil
Farnesene	2 - 4% of total oil
Humulene	20 - 24% of total oil
Other	38 - 48% of total oil



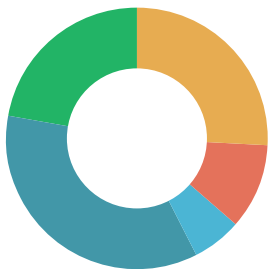
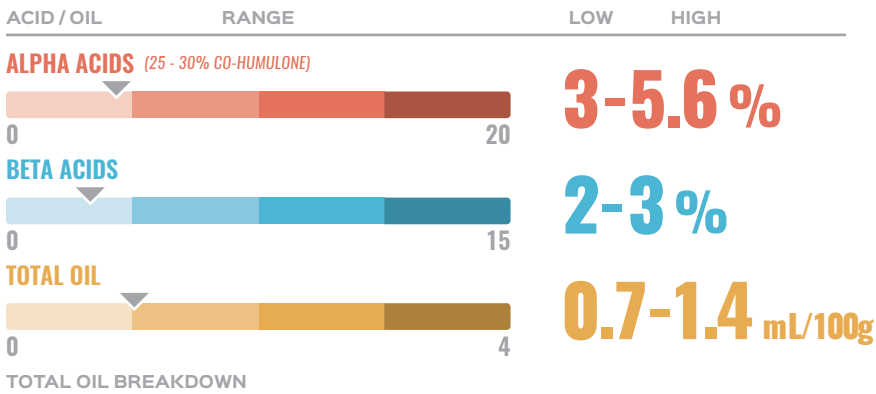
AN AROMA HOP

FUGGLE

Selected from a seedling in 1861 and released in 1875, Fuggle is the most revered and famous English variety. It is known for its classic English aroma and is often used in conjunction with Golding.

COUNTRY: UNITED KINGDOM
AROMA PROFILE: GREEN TEA, MINT, GRASS, FLORAL
BEER STYLES: ENGLISH-STYLE BITTER, STOUT, BROWN ALE, PORTER, PALE ALE

BREWING VALUES:



Myrcene	24 - 28% of total oil
Caryophyllene	9 - 13% of total oil
Farnesene	5 - 7% of total oil
Humulene	33 - 38% of total oil
Other	14 - 29% of total oil



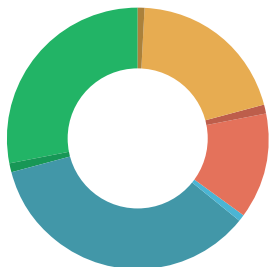
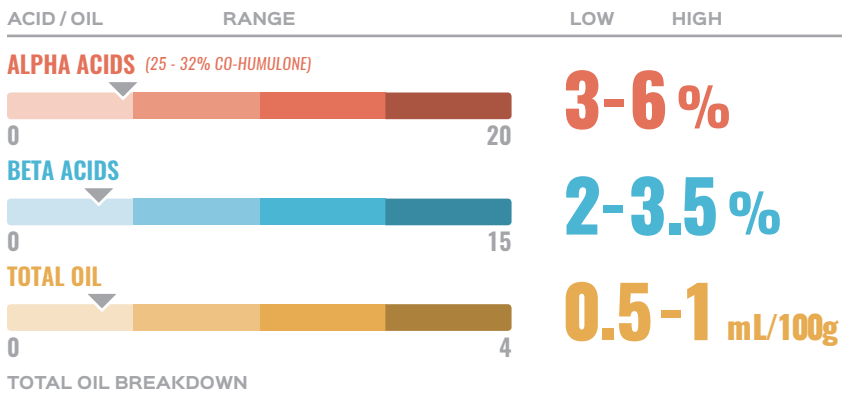
AN AROMA HOP

FUGGLE

Discovered as a chance seedling in 1861 and propagated by Richard Fuggle in Kent, England in 1875, Fuggle was once the most prominent English hop. It accounted for 78% of production in 1949. The variety is now grown in the United States, primarily in Oregon, and displays slightly stronger characteristics than the English version. Fuggle is often compared to, and used in conjunction with Golding hops.

COUNTRY: UNITED STATES
AROMA PROFILE: MILD, WOOD, GRASS, MINT
BEER STYLES: PALE ALE, BROWN ALE, STOUT

BREWING VALUES:



	B-Pinene	0.2 - 0.5% of total oil
	Myrcene	15 - 25% of total oil
	Linalool	0.6 - 1.0% of total oil
	Caryophyllene	11 - 15% of total oil
	Farnesene	5 - 8% of total oil
	Humulene	30 - 40% of total oil
	Geraniol	0.1 - 0.3% of total oil
	Other	10 - 38% of total oil



AN AROMA HOP

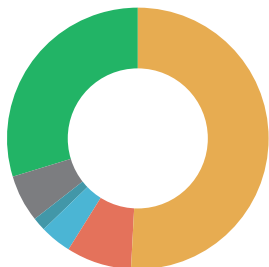
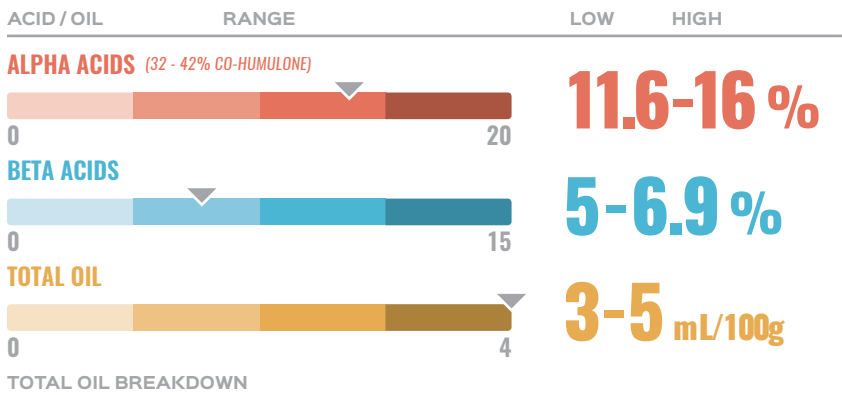
GALAXY™

94 - 203 - 008

Commercially available since 2009, Galaxy™ is the most internationally recognized Australian hop variety. Its lineage includes high alpha Australian hops and European cultivars, specifically German Perle.

COUNTRY: AUSTRALIA
AROMA PROFILE: PASSIONFRUIT, PEACH, CLEAN CITRUS
BEER STYLES: PALE ALE, IPA

BREWING VALUES:



Myrcene	33 - 69% of total oil
Caryophyllene	7 - 9% of total oil
Farnesene	~4% of total oil
Humulene	1 - 2% of total oil
Other	8 - 51% of total oil
Selinene	4 - 8% of total oil



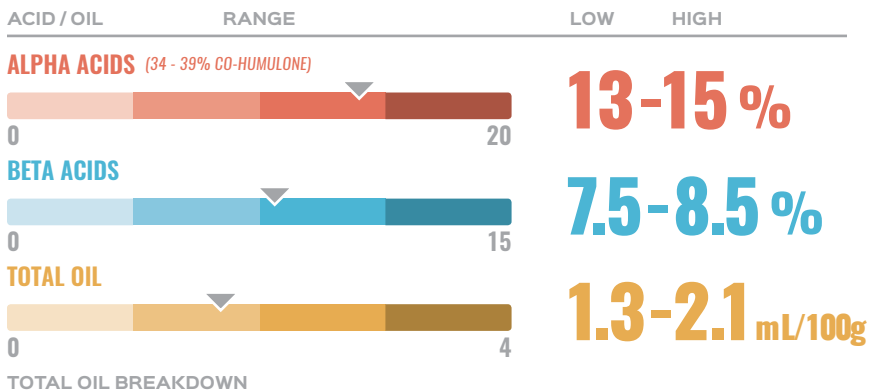
A BITTERING HOP

GALENA

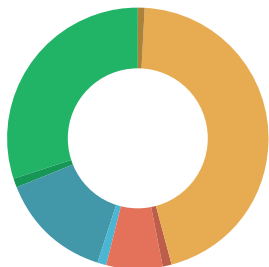
Developed by the USDA breeding program in Idaho in 1968 and released in 1978, Galena is an open pollinated cross of Brewer's Gold. It is a high alpha variety with increasingly popular aroma characteristics.

COUNTRY: UNITED STATES
AROMA PROFILE: SWEET, PEAR, PINEAPPLE, LIME, BLACKCURRANT, GRAPEFRUIT
BEER STYLES: AMERICAN-STYLE ALE, PORTER, STOUT

BREWING VALUES:



TOTAL OIL BREAKDOWN



	B-Pinene	0.4 - 0.7% of total oil
	Myrcene	40 - 50% of total oil
	Linalool	0.1 - 0.3% of total oil
	Caryophyllene	5 - 9% of total oil
	Farnesene	< 1.0% of total oil
	Humulene	11 - 17% of total oil
	Geraniol	0.5 - 0.8% of total oil
	Other	21 - 42% of total oil



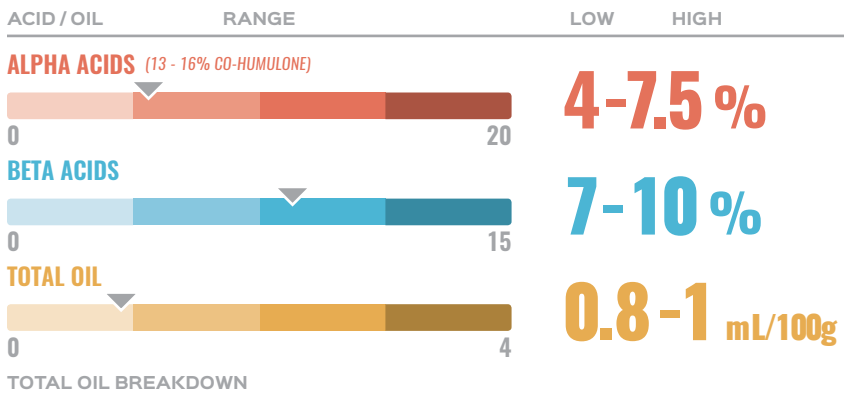
A DUAL PURPOSE HOP

GLACIER

Released in 2000 by Washington State University, Glacier is an offspring of French Elsasser, Brewer's Gold and Northern Brewer. It was selected for its good yield potential and low co-humulone, providing smoothness and balanced bitterness in beer.

COUNTRY: UNITED STATES
AROMA PROFILE: PLUM, BLACKBERRY, WOOD
BEER STYLES: ENGLISH-STYLE PALE ALE, PORTER, STOUT, ENGLISH-STYLE BITTER

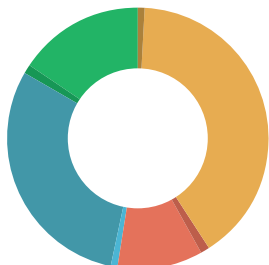
BREWING VALUES:



4-7.5%

7-10%

0.8-1 mL/100g



	B-Pinene	0.2 - 0.6% of total oil
	Myrcene	35 - 45% of total oil
	Linalool	0.8 - 1.1% of total oil
	Caryophyllene	8 - 13% of total oil
	Farnesene	< 1.0% of total oil
	Humulene	25 - 35% of total oil
	Geraniol	0.2 - 0.3% of total oil
	Other	4 - 30% of total oil



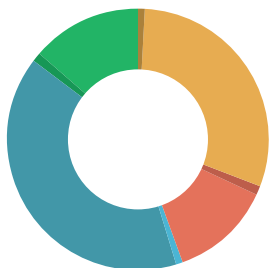
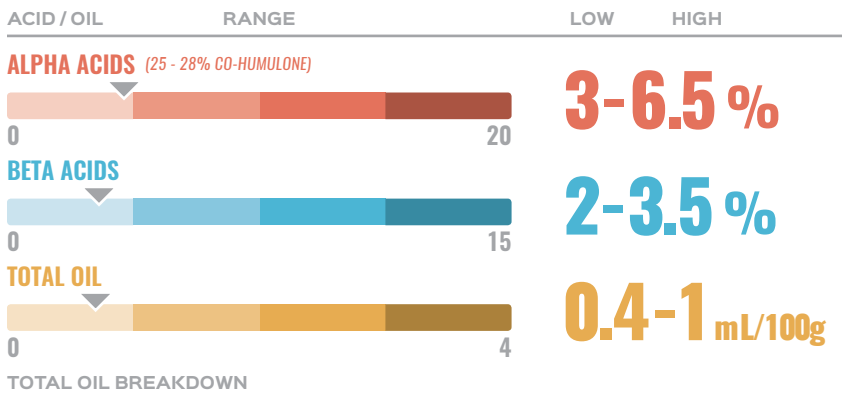
AN AROMA HOP

GOLDING

Golding hops consist of a group of traditional English aroma varieties which have been cultivated since 1790. The cultivar originated in England and was named after villages in East Kent (Petham, Rothersham, Canterbury, Eastwell). US Golding is the Canterbury strain.

COUNTRY: UNITED STATES
AROMA PROFILE: DELICATE, SWEET FLORAL
BEER STYLES: PALE ALE, STOUT, BITTER, BARLEY WINE

BREWING VALUES:



	B-Pinene	0.3 - 0.5% of total oil
	Myrcene	25 - 35% of total oil
	Linalool	0.6 - 0.9% of total oil
	Caryophyllene	10 - 15% of total oil
	Farnesene	< 1.0% of total oil
	Humulene	35 - 45% of total oil
	Geraniol	0.1 - 0.3% of total oil
	Other	2 - 28% of total oil



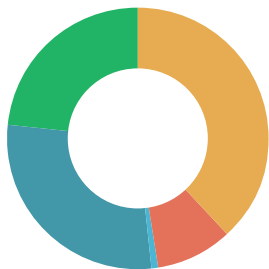
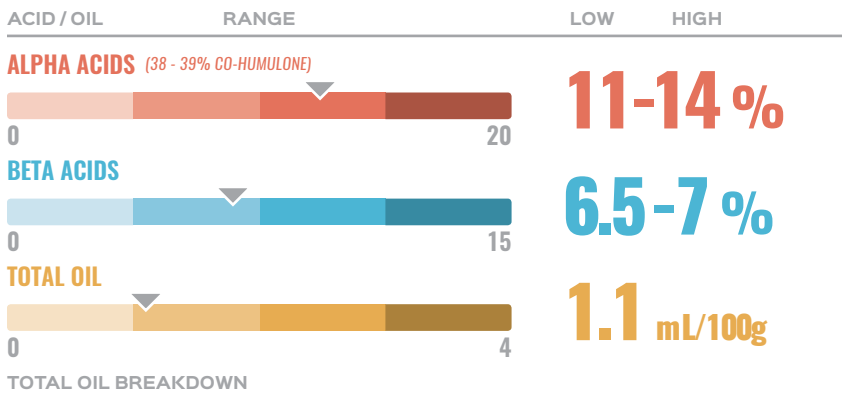
A DUAL PURPOSE HOP

GREEN BULLET

Released in 1972 from the New Zealand DSIR (now New Zealand Institute for Plant and Food Research) Green Bullet is a triploid alpha variety bred by open pollination of the New Zealand "Smoothcone" variety. It is traditionally considered a bittering variety for lagers, but also carries a spicy characteristics typical of Slovenia hop varieties.

COUNTRY: **NEW ZEALAND**
AROMA PROFILE: **SPICY, DRIED FRUIT, FLORAL**
BEER STYLES: **ENGLISH-STYLE BITTER, LAGER, STOUT**

BREWING VALUES:



Myrcene	38.3% of total oil
Caryophyllene	9.2% of total oil
Farnesene	0.3% of total oil
Humulene	28.2% of total oil
Other	24% of total oil



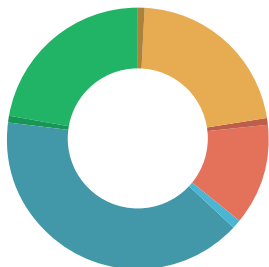
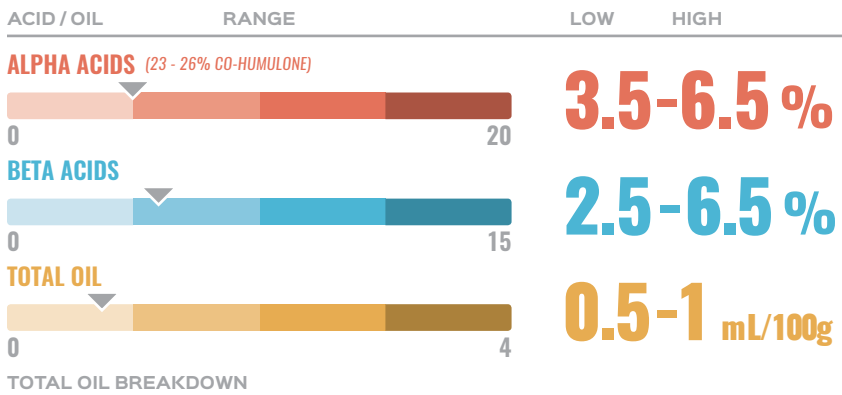
AN AROMA HOP

HALLERTAU

US Hallertau originates from the classic Hallertau variety of Germany. It is a noble aroma variety. Despite low yield and low resistance to disease, Hallertau remains a historic hop and is often celebrated in the production of purist recipes and traditional beer styles.

COUNTRY: UNITED STATES
AROMA PROFILE: NOBLE
BEER STYLES: PILSNER, LAGER, BOCK

BREWING VALUES:



	B-Pinene	0.2 - 0.6% of total oil
	Myrcene	18 - 25% of total oil
	Linalool	0.6 - 1.0% of total oil
	Caryophyllene	10 - 15% of total oil
	Farnesene	< 1.0% of total oil
	Humulene	35 - 45% of total oil
	Geraniol	0.1 - 0.6% of total oil
	Other	12 - 35% of total oil

AN AROMA HOP

HALLERTAU BLANC



Bred at the Hop Research Institute in Hüll and released in 2012, Hallertau Blanc was commercialized as a new, German aroma variety in response to growing demand from the craft beer industry for distinct flavor profiles. Hallertau Blanc is the daughter of Cascade and displays a wide variety of tropical fruit, stone fruit and citrus flavors.

COUNTRY: GERMANY
AROMA PROFILE: PASSION FRUIT, GRAPEFRUIT,
PINEAPPLE, GRAPE, LEMONGRASS
BEER STYLES: IPA, PALE ALE

BREWING VALUES:

ACID / OIL RANGE LOW HIGH

ALPHA ACIDS (22 - 26% CO-HUMULONE)



9-12%

BETA ACIDS



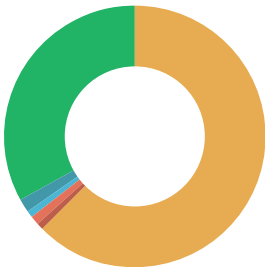
4.5-5.5%

TOTAL OIL



1.2-1.5 mL/100g

TOTAL OIL BREAKDOWN



Myrcene	50 - 75% of total oil
Linalool	0.2 - 0.5% of total oil
Caryophyllene	0 - 2% of total oil
Farnesene	< 1.0% of total oil
Humulene	0 - 3% of total oil
Other	19 - 49% of total oil



A DUAL PURPOSE HOP

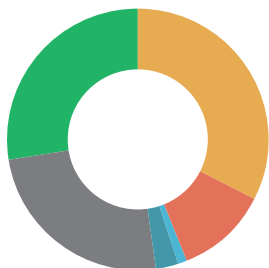
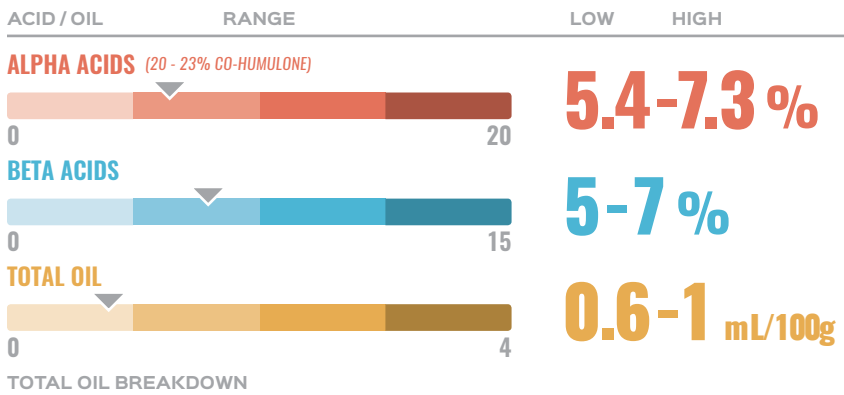
HELGA™

A - 86 - 29

Bred in 1986 and formerly known as Southern Hallertau, Helga™ is a descendant of Hallertau Mittelfrüh. Its brewing characteristics resemble that of its parent, however it demonstrates a forgiving and refined character in a variety of beer styles and hop applications.

COUNTRY: AUSTRALIA
AROMA PROFILE: PLEASANT, NOBLE
BEER STYLES: ALE, LAGER

BREWING VALUES:



Myrcene	1 - 13% of total oil
Linalool	0.1 - 0.6% of total oil
Caryophyllene	10 - 45% of total oil
Farnesene	< 1.0% of total oil
Humulene	35 - 55% of total oil
Other	< 1% - 51% of total oil
Selinene	2 - 4% of total oil



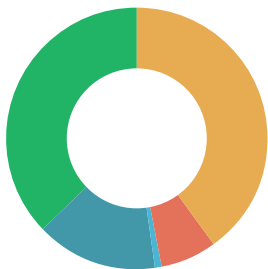
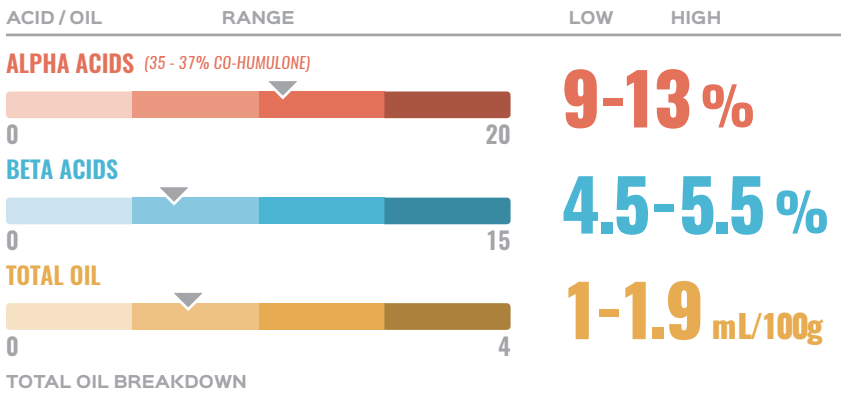
A DUAL PURPOSE HOP

HERALD

Bred at Wye College and registered in 1996, Herald is a sister to Pioneer and Pilgrim hops. It is known for its clean bittering characteristics and fresh citrus flavors.

COUNTRY: UNITED KINGDOM
AROMA PROFILE: ORANGE, GRAPEFRUIT
BEER STYLES: PALE ALE, DARK ALE, ENGLISH-STYLE BITTER

BREWING VALUES:



Myrcene	~40% of total oil
Caryophyllene	~7% of total oil
Farnesene	< 1.0% of total oil
Humulene	~15% of total oil
Other	37 - 59% of total oil

A BITTERING HOP

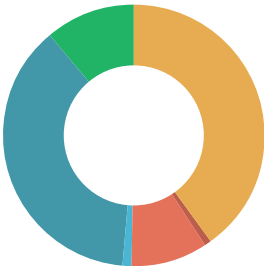
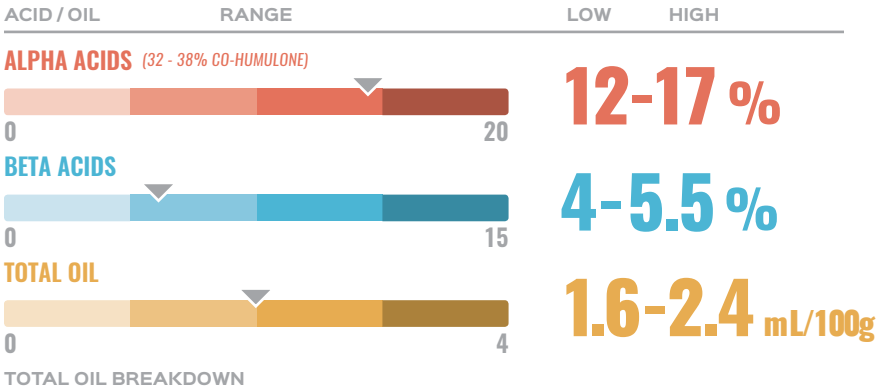
HERKULES



Bred at the Hop Research Center in Hüll and released in 2006, Herkules is a high alpha, bittering hop that holds true to its name. It is a daughter of Taurus with some citrus and melon characteristics.

COUNTRY: GERMANY
AROMA PROFILE: ROBUST, MELON
BEER STYLES: LAGER, ALTBIER,
GERMAN-STYLE ALE,

BREWING VALUES:



Myrcene	30 - 50% of total oil
Linalool	0.3 - 0.8% of total oil
Caryophyllene	7 - 12% of total oil
Farnesene	< 1.0% of total oil
Humulene	30 - 45% of total oil
Other	< 1% - 32% of total oil

AN AROMA HOP

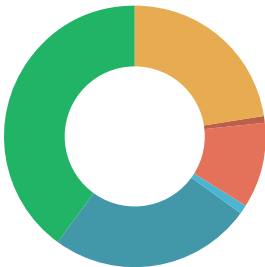
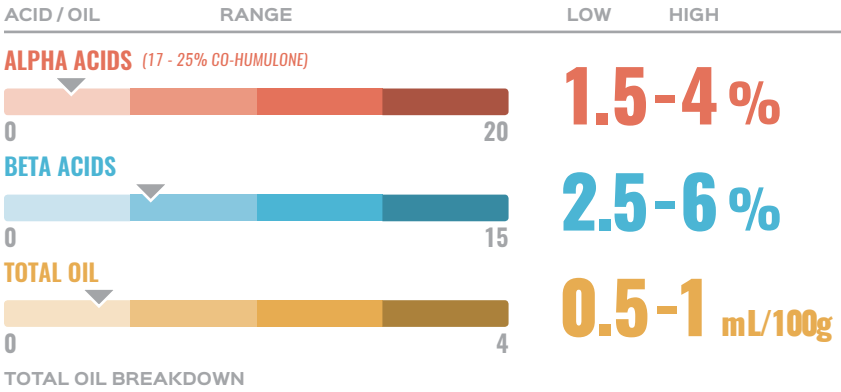
HERSBRUCKER



A landrace variety originating from the Hersbruck region of Southern Germany, Hersbrucker has expanded and is now widely grown throughout the Hallertau and Spalt regions. It displays a delicate aroma profile that is often compared to other noble varieties.

COUNTRY: GERMANY
AROMA PROFILE: HAY, TOBACCO, ORANGE
BEER STYLES: LAGER, PILSNER, BOCK, WHEAT, KÖLSCH, HELLES

BREWING VALUES:



Myrcene	15 - 30% of total oil
Linalool	0.5 - 1% of total oil
Caryophyllene	8 - 13% of total oil
Farnesene	< 1.0% of total oil
Humulene	20 - 30% of total oil
Other	25 - 56% of total oil



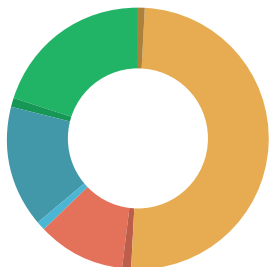
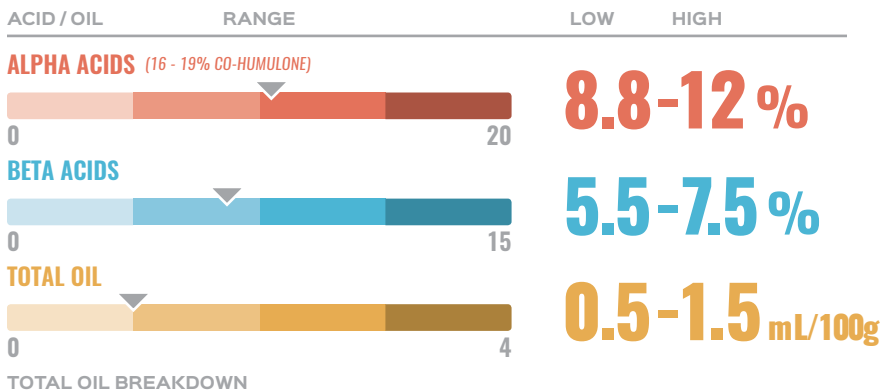
A DUAL PURPOSE HOP

HORIZON

Bred in Oregon in 1970 and released in 1997, Horizon is a descendant of Brewer's Gold and half-sister to Nugget. Its low co-humulone is similar to noble varieties and provides smoothness to beer, however alpha acid levels can reach as high as 12%. Horizon can be utilized in every stage of the brewing process.

COUNTRY: UNITED STATES
AROMA PROFILE: FLORAL BOUQUET, SPICY
BEER STYLES: ALE, LAGER

BREWING VALUES:



	B-Pinene	0.6 - 0.8% of total oil
	Myrcene	45 - 55% of total oil
	Linalool	0.9 - 1.5% of total oil
	Caryophyllene	8 - 14% of total oil
	Farnesene	3 - 5% of total oil
	Humulene	10 - 20% of total oil
	Geraniol	0.1 - 0.5% of total oil
	Other	3 - 32% of total oil

AN AROMA HOP

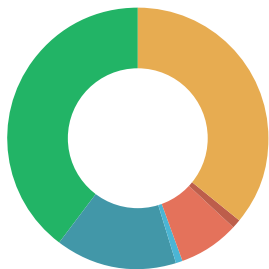
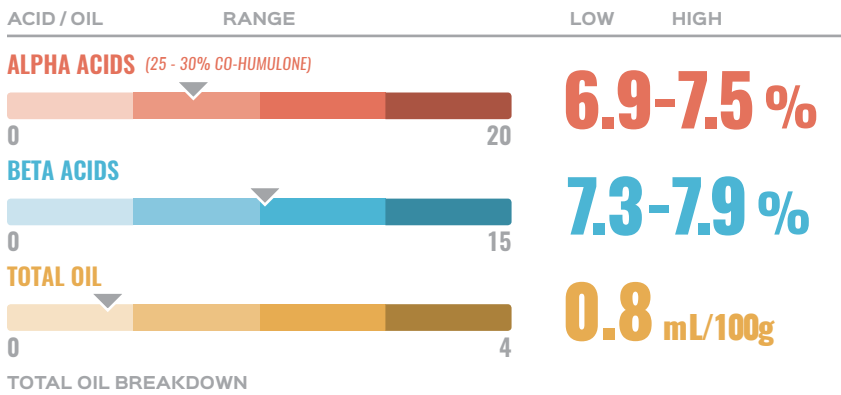
HUELL MELON



Bred at the Hop Research Institute in Hüll and released in 2012, Huell (Hüll) Melon was commercialized as a new, German aroma variety in response to growing demand from the craft beer industry for distinct flavor profiles. It displays bold flavors that are not associated with typical hop variety aromas and has found favor in many hop forward, IPA and pale ale beer styles.

COUNTRY: GERMANY
AROMA PROFILE: HONEYDEW MELON, ORANGE, STRAWBERRY, TROPICAL FRUIT
BEER STYLES: WHEAT, BELGIAN-STYLE ALE, PALE ALE

BREWING VALUES:



Myrcene	36% of total oil
Linalool	0.4 - 0.7% of total oil
Caryophyllene	5 - 10% of total oil
Farnesene	< 1.0% of total oil
Humulene	10 - 20% of total oil
Other	32 - 48% of total oil

AN AROMA HOP

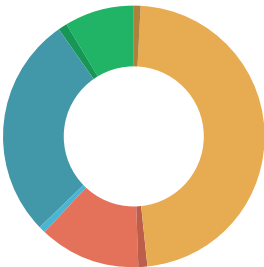
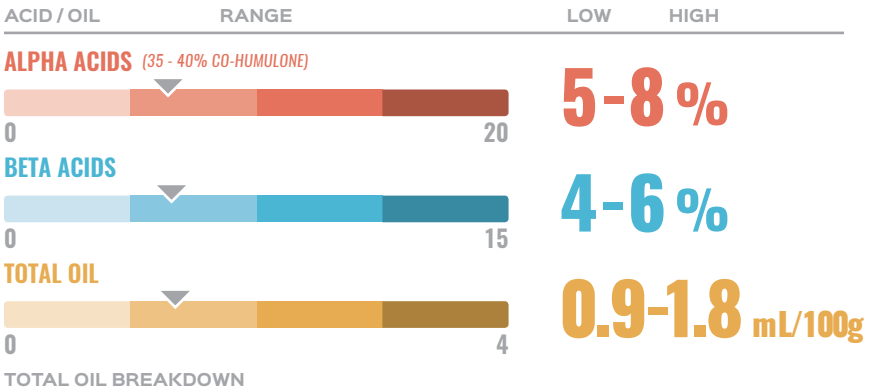
KAZBEK











Selected from breeding material with origin in Russian wild hops, Kazbek was released in 2008. It is named after the highest peak within the middle Caucasus mountain range.

COUNTRY: CZECH REPUBLIC
AROMA PROFILE: SPICY, LEMON
BEER STYLES: PILSNER, LAGER, IPA

BREWING VALUES:



	B-Pinene	0.5 - 0.9% of total oil
	Myrcene	40 - 55% of total oil
	Linalool	0.3 - 0.5% of total oil
	Caryophyllene	10 - 15% of total oil
	Farnesene	< 1.0% of total oil
	Humulene	20 - 35% of total oil
	Geraniol	0.05 - 0.2% of total oil
	Other	< 1% - 28% of total oil



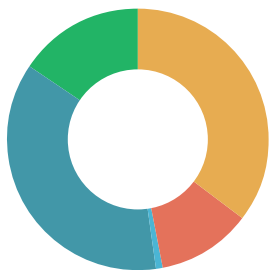
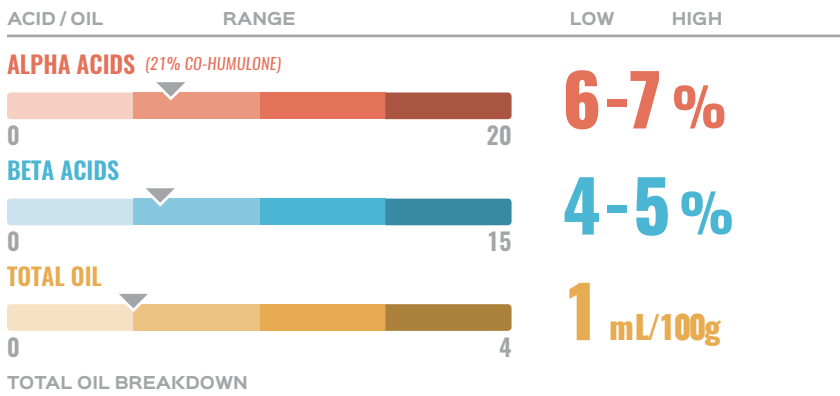
AN AROMA HOP

KOHATU

Developed by the New Zealand Institute for Plant and Food Research hop breeding program and released in 2011, Kohatu is a descendant of Hallertau Mittelfrüh. It works well in single hop applications and is described as having intense fruit characteristics.

COUNTRY: NEW ZEALAND
AROMA PROFILE: TROPICAL FRUIT
BEER STYLES: PALE ALE, PILSNER

BREWING VALUES:



Myrcene	35.5% of total oil
Caryophyllene	11.5% of total oil
Farnesene	0.3% of total oil
Humulene	36.5% of total oil
Other	16.2% of total oil

AN AROMA HOP

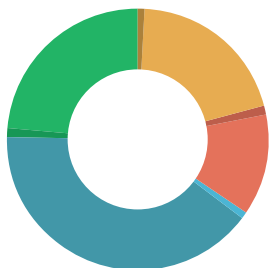
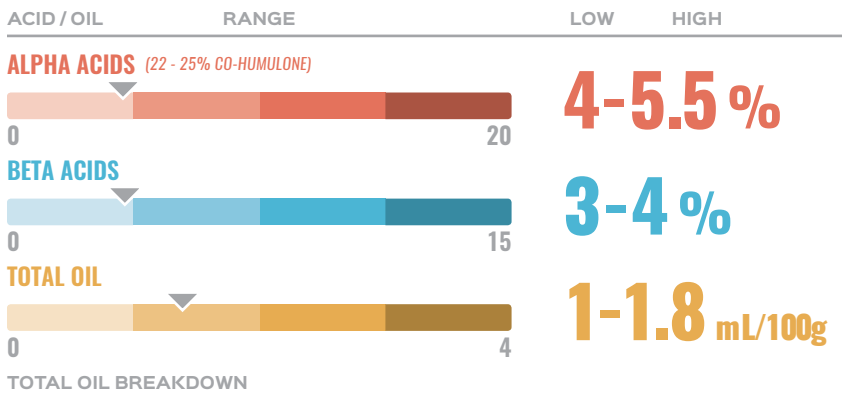
LIBERTY



Bred in 1983, Liberty is an extension of the Hallertau hop family. It is a half-sister to Ultra, Mt. Hood and Crystal. It displays mild floral and spice characteristics with some subtle citrus notes.

COUNTRY: UNITED STATES
AROMA PROFILE: NOBLE, FLORAL, HERBAL
SPICY, DELICATE, LEMON
BEER STYLES: PILSNER, BOCK, WHEAT,
LAGER, KÖLSCH

BREWING VALUES:



	B-Pinene	0.1 - 0.3% of total oil
	Myrcene	15 - 25% of total oil
	Linalool	0.6 - 1.0% of total oil
	Caryophyllene	10 - 15% of total oil
	Farnesene	< 1.0% of total oil
	Humulene	35 - 45% of total oil
	Geraniol	0.1 - 0.3% of total oil
	Other	12 - 38% of total oil



A DUAL PURPOSE HOP

LORAL™

HBC 291 CV.

Developed by Hop Breeding Company and released in 2016, Loral™ HBC 291 has a noble heritage that straddles the fence between old and new world hop aromatics. It has the ability to complement all beer styles, making it a very versatile hop in the brewery.

COUNTRY: UNITED STATES
AROMA PROFILE: FLORAL, LEMON-CITRUS, PEPPER, DARK FRUIT
BEER STYLES: ALL STYLES

BREWING VALUES:

ACID / OIL RANGE LOW HIGH

ALPHA ACIDS (21-24% CO-HUMULONE)



11.3-12.2%

BETA ACIDS



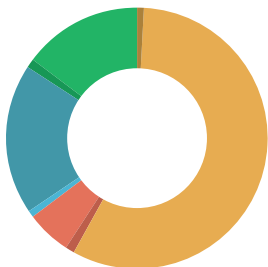
4.9-5.3%









TOTAL OIL



1.8-2.9 mL/100g

TOTAL OIL BREAKDOWN



	B-Pinene	0.6 - 0.7% of total oil
	Myrcene	52 - 58% of total oil
	Linalool	1 - 1.1% of total oil
	Caryophyllene	5 - 5.7% of total oil
	Farnesene	< 1.0% of total oil
	Humulene	17.8 - 17.9% of total oil
	Geraniol	0.2 - 0.3% of total oil
	Other	15.3 - 22.4% of total oil

A BITTERING HOP

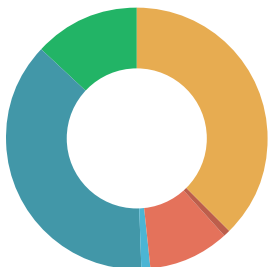
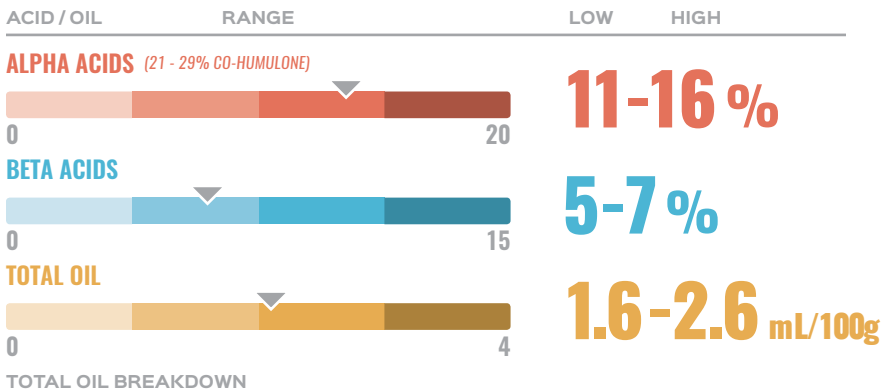
MAGNUM



Bred at the Hop Research Center in Hüll in 1980 and released in 1993, Magnum is a daughter of Galena. It is a high alpha variety with some spice and fruit characteristics.

COUNTRY: GERMANY
AROMA PROFILE: APPLE, PEPPER
BEER STYLES: IPA, LAGER, PILSNER, STOUT

BREWING VALUES:



Myrcene	30 - 45% of total oil
Linalool	0.2 - 0.3% of total oil
Caryophyllene	8 - 12% of total oil
Farnesene	< 1.0% of total oil
Humulene	30 - 45% of total oil
Other	< 1% - 31% of total oil



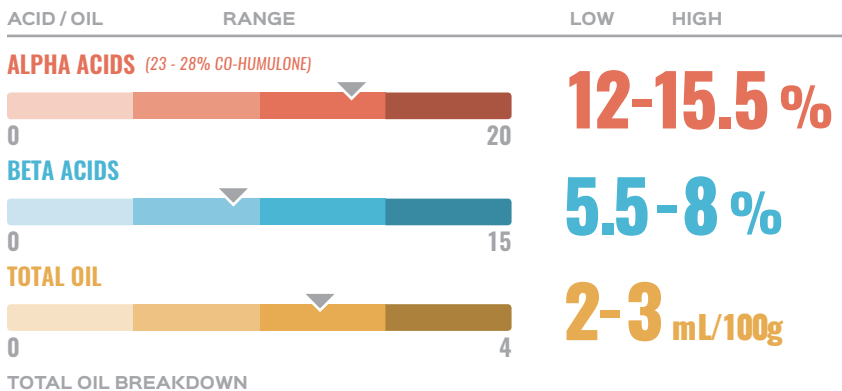
A BITTERING HOP

MAGNUM

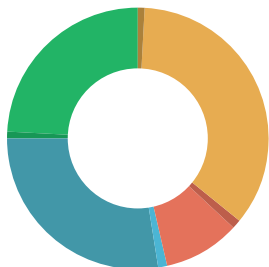
Bred at the Hop Research Center in Hüll in 1980 and released in 1993, Magnum is a German variety (also grown in the US) and daughter of Galena. It is a high alpha cultivar and is often used as the base bittering variety. Magnum does not display any distinct aroma characteristics, however, subtle spice and fruit characteristics have been noted by some brewers.

COUNTRY: UNITED STATES
AROMA PROFILE: NO DISTINCT CHARACTERISTICS
BEER STYLES: IPA, LAGER, PILSNER, STOUT

BREWING VALUES:



TOTAL OIL BREAKDOWN



	B-Pinene	0.4 - 0.8% of total oil
	Myrcene	30 - 40% of total oil
	Linalool	0.4 - 0.7% of total oil
	Caryophyllene	7 - 12% of total oil
	Farnesene	< 1.0% of total oil
	Humulene	25 - 30% of total oil
	Geraniol	0.3 - 0.6% of total oil
	Other	15 - 36% of total oil

AN AROMA HOP

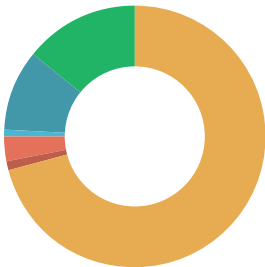
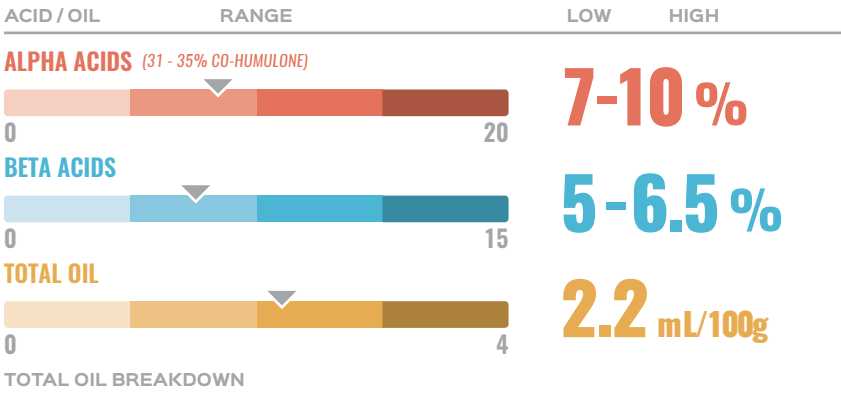
MANDARINA BAVARIA



Bred at the Hop Research Institute in Hüll and released in 2012, Mandarina Bavaria was commercialized as a new, German aroma variety in response to growing demand from the craft beer industry for distinct flavor profiles. It is the daughter of Cascade and displays many citrus characteristics, however, the most notable aroma is tangerine.

COUNTRY: GERMANY
AROMA PROFILE: TANGERINE, GRAPEFRUIT, LIME
BEER STYLES: IPA, SAISON

BREWING VALUES:



Myrcene	~71% of total oil
Linalool	0.1 - 0.6% of total oil
Caryophyllene	1 - 5% of total oil
Farnesene	< 1.0% of total oil
Humulene	5 - 15% of total oil
Other	78 - 22% of total oil

A DUAL PURPOSE HOP

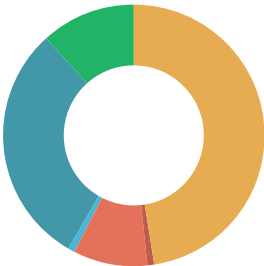
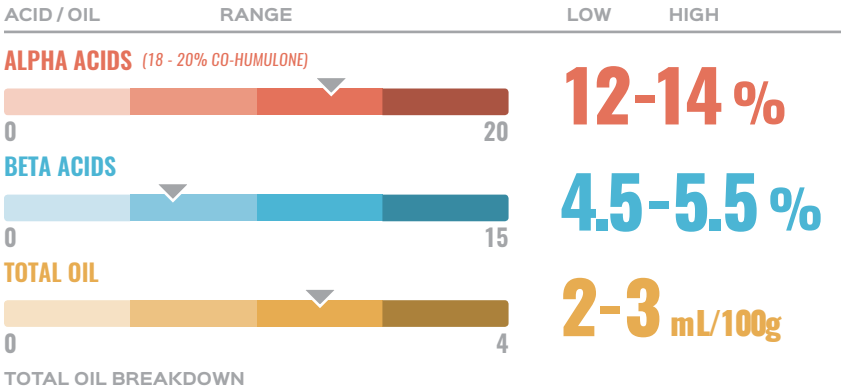
MERKUR



Bred at the Hop Research Institute in Hüll and registered in 2001, Merkur was the first mildew-resistant hop variety from the research center. It is a cross between Magnum and German experimental variety 81/8/13. It is a high alpha variety with low co-humulone oil percentages. In some dual purpose applications, Merkur displays subtle earth and citrus notes.

COUNTRY: GERMANY
AROMA PROFILE: SUGAR, PINEAPPLE, MINT
BEER STYLES: LAGER, PILSNER, STOUT

BREWING VALUES:



Myrcene	45 - 50% of total oil
Linalool	0.6 - 1.1% of total oil
Caryophyllene	8 - 10% of total oil
Farnesene	< 1.0% of total oil
Humulene	28 - 32% of total oil
Other	6 - 17% of total oil



A BITTERING HOP

MILLENNIUM

Bred by the John I. Haas breeding program and released in 2000, Millennium is a super-alpha variety with mild herbal aromas. It is a descendant of Nugget.

COUNTRY: UNITED STATES
AROMA PROFILE: RESIN, HERBAL, FLORAL, PEAR
BEER STYLES: ALE, BARLEY WINE, STOUT

BREWING VALUES:

ACID / OIL RANGE LOW HIGH

ALPHA ACIDS (29 - 35% CO-HUMULONE)



15.5-18.5 %

BETA ACIDS



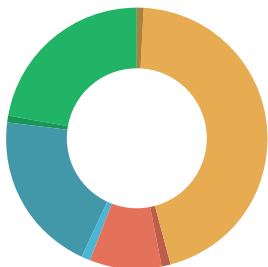
5-6.5 %

TOTAL OIL



1.5-3 mL/100g

TOTAL OIL BREAKDOWN



B-Pinene	0.4 - 0.8% of total oil
Myrcene	35 - 55% of total oil
Linalool	0.3 - 0.6% of total oil
Caryophyllene	8 - 10% of total oil
Farnesene	< 1.0% of total oil
Humulene	15 - 25% of total oil
Geraniol	0.1 - 0.3% of total oil
Other	7 - 40% of total oil

AN AROMA HOP

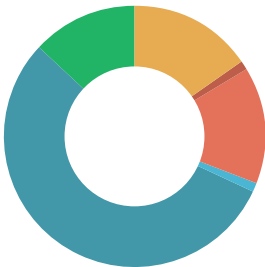
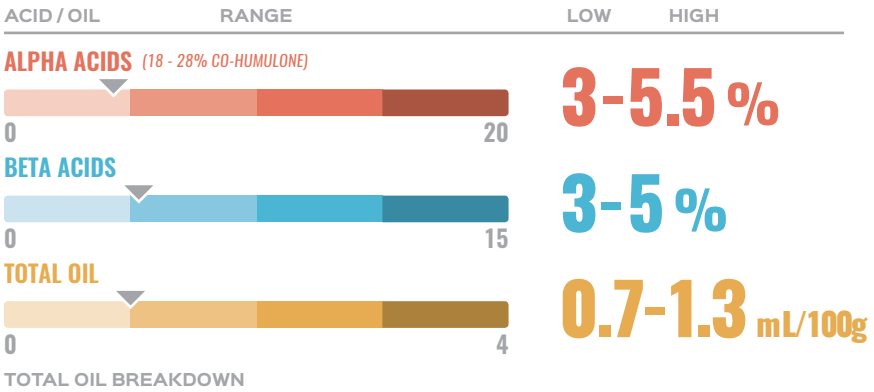
MITTELFRÜH



Despite being grown in regions throughout Germany, Mittelfrüh is commonly referred to as "Hallertau Mittelfrüh" as it was once the major Hallertau landrace variety. It is a classic German aroma hop associated with Bavarian-style lager beers, however, due to disease, acreage has been decreasing. Mittelfrüh is distinguished by an intense, pleasantly-harmonic bitterness.

COUNTRY: GERMANY
AROMA PROFILE: GRASS, TEA, CITRUS
BEER STYLES: LAGER, PILSNER, WHEAT, CASK-CONDITIONED ALES

BREWING VALUES:



Myrcene	15.5 of total oil
Linalool	0.7 - 1.1% of total oil
Caryophyllene	14.6% of total oil
Farnesene	< 1.0% of total oil
Humulene	55.1% of total oil
Other	23 - 28% of total oil



A DUAL PURPOSE HOP

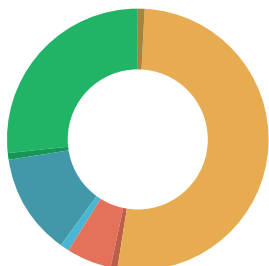
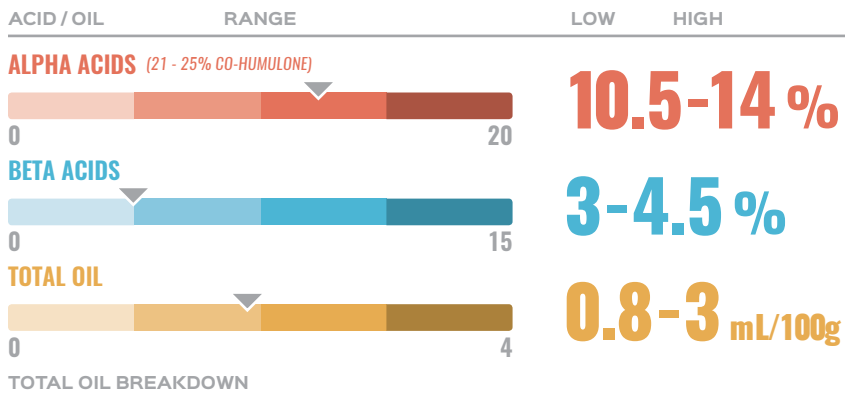
MOSAIC®

HBC 369 CV

Developed by Hop Breeding Company and released in 2012, Mosaic® contains high alpha content and features a unique and complex aroma profile that translates favorably into a variety of beer styles. It is a daughter of Simcoe® YCR 14 and a Nugget derived male. Mosaic® is named in honor of the artistic assortment of aromas and flavors it is capable of presenting.

COUNTRY: UNITED STATES
AROMA PROFILE: BLUEBERRY, TANGERINE, PAPAYA, BLOSSOMS, ROSE, BUBBLE GUM
BEER STYLES: PALE ALE, IPA, STOUT

BREWING VALUES:



	B-Pinene	0.6 - 1.0% of total oil
	Myrcene	48 - 55% of total oil
	Linalool	0.4 - 0.8% of total oil
	Caryophyllene	3 - 8% of total oil
	Farnesene	< 1.0% of total oil
	Humulene	10 - 15% of total oil
	Geraniol	0.5 - 0.9% of total oil
	Other	18 - 37% of total oil



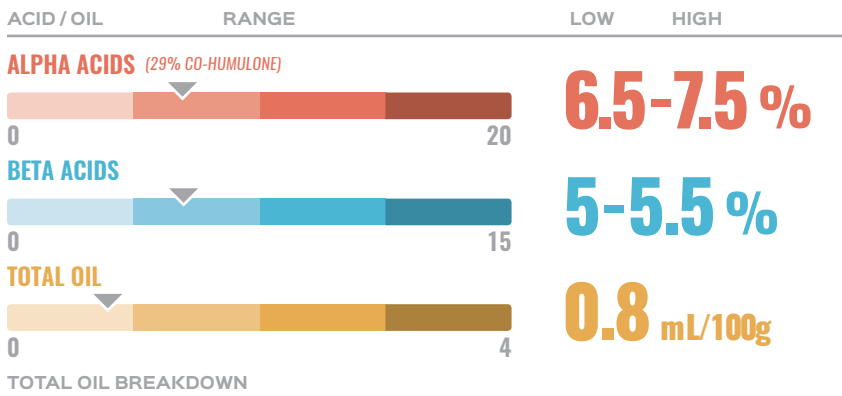
AN AROMA HOP

MOTUEKA

Developed by the New Zealand Institute for Plant and Food Research hop breeding program and released in 1996, Motueka is a cross between a New Zealand breeding selection and Saaz. It offers a unique aroma and flavor profile suitable for producing big beer styles. Motueka performs well when used in multiple additions from a single hop bill.

COUNTRY: **NEW ZEALAND**
AROMA PROFILE: **LEMON, LIME, TROPICAL FRUIT**
BEER STYLES: **ENGLISH-STYLE ALE, LAGER, PILSNER**

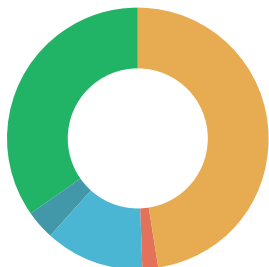
BREWING VALUES:



6.5-7.5 %

5-5.5 %

0.8 mL/100g



	Myrcene	47.7% of total oil
	Caryophyllene	2% of total oil
	Farnesene	12.2% of total oil
	Humulene	3.6% of total oil
	Other	34.5% of total oil



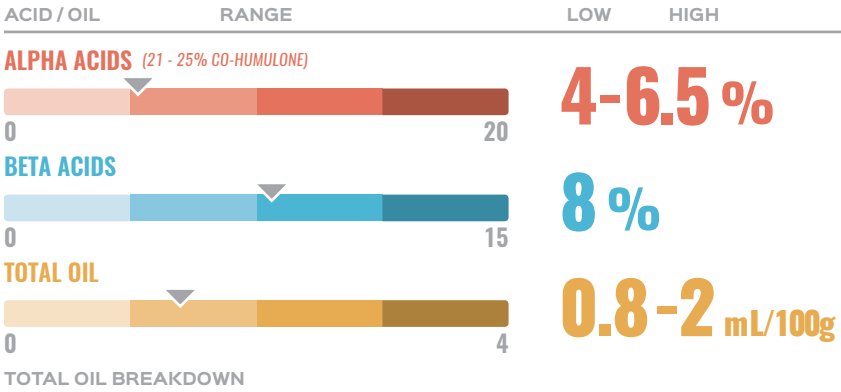
AN AROMA HOP

MT. HOOD

Bred in 1983 and released from the USDA breeding program in Oregon in 1989, Mt. Hood is a triploid aroma-type cultivar with similarities to German Hallertau and German Hersbrucker. It is named after the famous Oregon volcano.

COUNTRY: UNITED STATES
AROMA PROFILE: PUNGENT
BEER STYLES: LAGER, ALTBIER, BOCK, HELLES, WHEAT

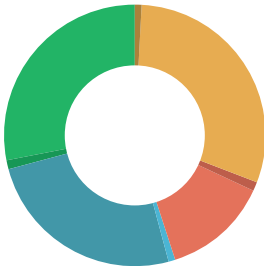
BREWING VALUES:



4-6.5%

8%

0.8-2 mL/100g



	B-Pinene	0.4 - 0.8% of total oil
	Myrcene	25 - 35% of total oil
	Linalool	0.5 - 0.9% of total oil
	Caryophyllene	10 - 16% of total oil
	Farnesene	< 1.0% of total oil
	Humulene	25% of total oil
	Geraniol	0.1 - 0.5% of total oil
	Other	21 - 38% of total oil



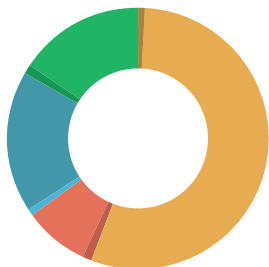
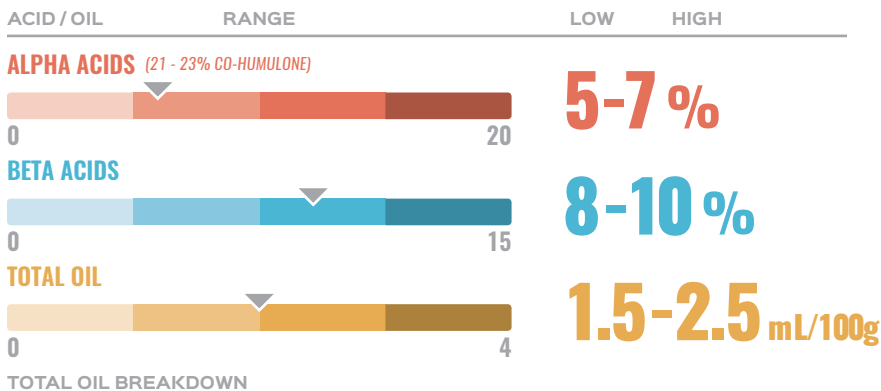
A DUAL PURPOSE HOP

MT. RAINIER

Bred by Oregon State University, Mt. Rainier is a dual purpose variety with noble aroma characteristics. It is similar to the classic German variety, Hallertau Mittelfrüh, but features more bittering strength.

COUNTRY: UNITED STATES
AROMA PROFILE: NOBLE, LICORICE, FLORAL
BEER STYLES: AMERICAN-STYLE ALE, LAGER, PILSNER

BREWING VALUES:



	B-Pinene	0.6 - 0.8% of total oil
	Myrcene	50 - 60% of total oil
	Linalool	0.6 - 0.9% of total oil
	Caryophyllene	6 - 10% of total oil
	Farnesene	< 1.0% of total oil
	Humulene	15 - 20% of total oil
	Geraniol	0.2 - 0.4% of total oil
	Other	7 - 27% of total oil



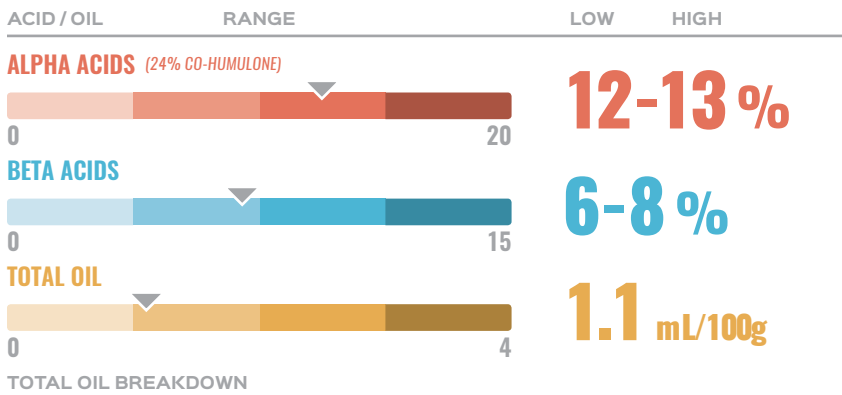
A DUAL PURPOSE HOP

NELSON SAUVIN

Developed by the New Zealand Institute for Plant and Food Research hop breeding program and released in 2000, Nelson Sauvin is a triploid variety bred from the New Zealand Smoothcone and a selected New Zealand male. It is known for being one of the most unique hop varieties, displaying strong fruit and white wine aroma characteristics.

COUNTRY: **NEW ZEALAND**
AROMA PROFILE: **WHITE WINE, GOOSEBERRY, GRAPE, SAUVIGNON BLANC**
BEER STYLES: **LAGER, PALE ALE, IPA**

BREWING VALUES:



Myrcene	22.2% of total oil
Caryophyllene	10.7% of total oil
Farnesene	0.4% of total oil
Humulene	36.4% of total oil
Other	30.3% of total oil



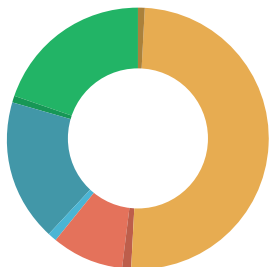
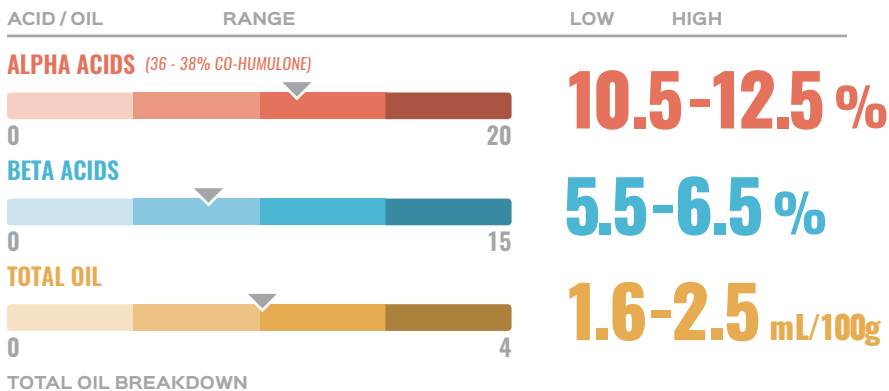
A BITTERING HOP









NEWPORT

Bred in 1992 by Oregon State University and released in 1992 through the USDA, Newport is a descendant of the classic bittering variety, Magnum. It contains high alpha acid, co-humulone and myrcene content, offering more distinct aroma characteristics than its parent.

COUNTRY: UNITED STATES
AROMA PROFILE: WINE, BALSAMIC
BEER STYLES: BARLEY WINE, STOUT,
AMERICAN-STYLE ALE

BREWING VALUES:



	B-Pinene	0.6 - 0.9% of total oil
	Myrcene	45 - 55% of total oil
	Linalool	0.3 - 0.7% of total oil
	Caryophyllene	7 - 11% of total oil
	Farnesene	< 1.0% of total oil
	Humulene	15 - 20% of total oil
	Geraniol	0.2 - 0.5% of total oil
	Other	11 - 31% of total oil



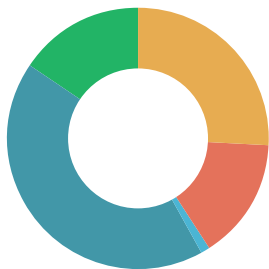
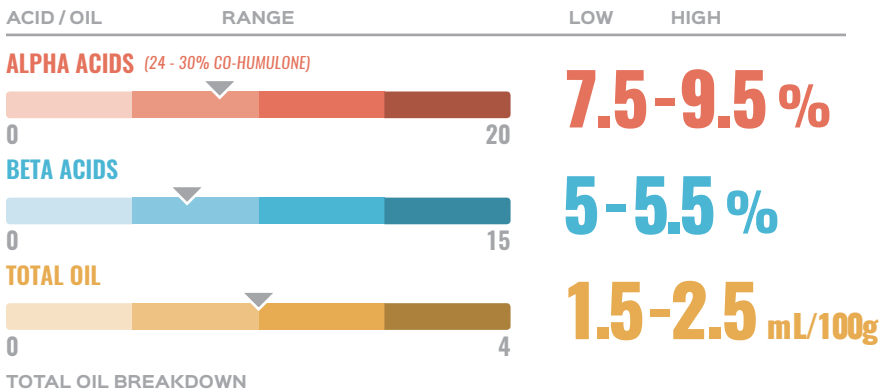
A DUAL PURPOSE HOP

NORTHDOWN

Bred at Wye College in 1970, Northdown is a cross between Northern Brewer and a German male. It is known for its fresh, yet rich flavor.

COUNTRY: UNITED KINGDOM
AROMA PROFILE: FLORAL, PINE, CEDAR, BERRY
BEER STYLES: PORTER, STOUT, LAGER, ALE, BARLEY WINE, BOCK

BREWING VALUES:



Myrcene	23 - 29% of total oil
Caryophyllene	13 - 17% of total oil
Farnesene	< 1.0% of total oil
Humulene	40 - 45% of total oil
Other	8 - 23% of total oil

A DUAL PURPOSE HOP

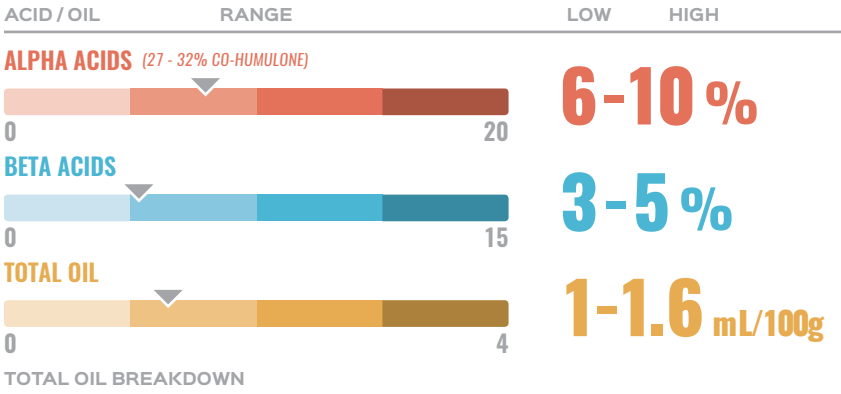
NORTHERN BREWER



Originally bred in England in 1934, Northern Brewer is a cross between Canterbury Golding and a male seedling of Brewer's Gold. It was originally grown in the North of England, but has become one of the main varieties in the Hallertau region of Germany. Northern Brewer displays pleasant pine and mint characteristics in dual purpose brewing applications.

COUNTRY: GERMANY
AROMA PROFILE: MINT, PINE, GRASS
BEER STYLES: PORTER, ENGLISH-STYLE BITTER, ENGLISH-STYLE PALE ALE

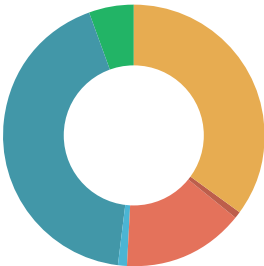
BREWING VALUES:



6-10%

3-5%

1-1.6 mL/100g



Myrcene	25 - 45% of total oil
Linalool	0.3 - 0.8% of total oil
Caryophyllene	10 - 20% of total oil
Farnesene	< 1.0% of total oil
Humulene	35 - 50% of total oil
Other	< 1% - 29% of total oil



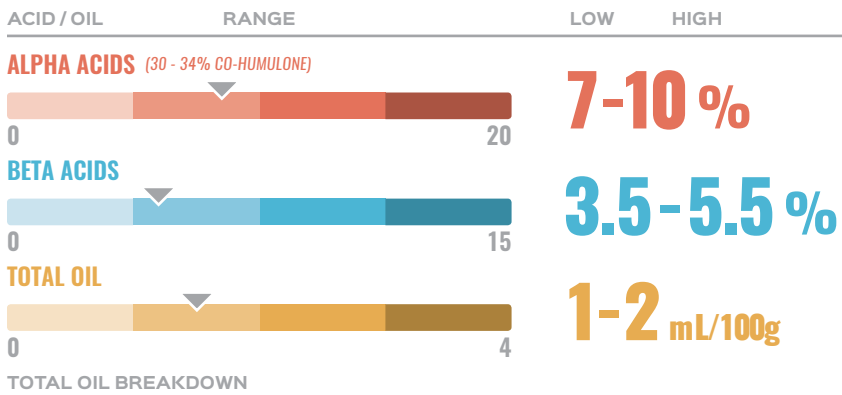
A DUAL PURPOSE HOP

NORTHERN BREWER

Bred in England in 1934 from a Canterbury Golding plant and male seedling of Brewer's Gold, Northern Brewer is mainly grown in the United States and Germany. US Northern Brewer contains slightly higher alpha acids and high myrcene oil content resulting in herbal, wood and peppery aroma characteristics; it is suitable for any stage of the brewing process.

COUNTRY: UNITED STATES
AROMA PROFILE: EVERGREEN, WOOD, MINT
BEER STYLES: ENGLISH-STYLE BITTER,
ENGLISH-STYLE PALE ALE, PORTER

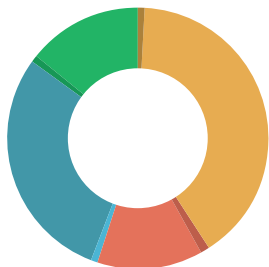
BREWING VALUES:



7-10%

3.5-5.5%

1-2 mL/100g



	B-Pinene	0.4 - 0.7% of total oil
	Myrcene	35 - 45% of total oil
	Linalool	0.4 - 0.8% of total oil
	Caryophyllene	11 - 15% of total oil
	Farnesene	< 1.0% of total oil
	Humulene	27 - 31% of total oil
	Geraniol	0.1 - 0.2% of total oil
	Other	6 - 25% of total oil



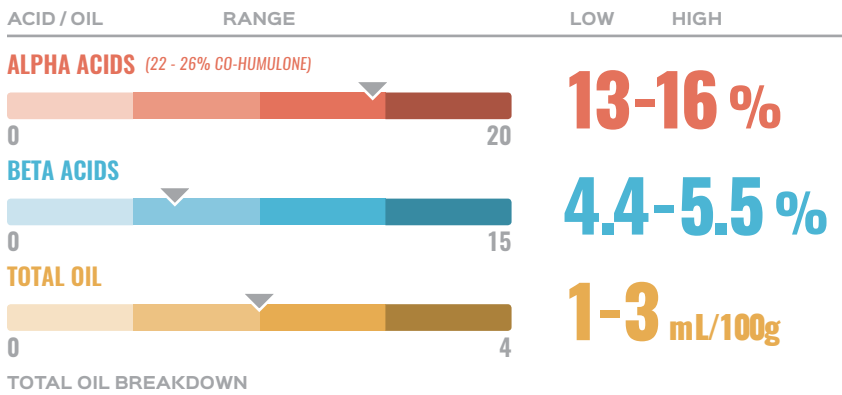
A BITTERING HOP

NUGGET

Bred in 1970 by the USDA breeding program in Oregon and released in 1983, Nugget is a high alpha cultivar that is beginning to gain some acceptance as a dual purpose variety. Its lineage includes Brewer's Gold, Canterbury Golding and Early Green.

COUNTRY: UNITED STATES
AROMA PROFILE: GREEN, WOOD, GINGER
BEER STYLES: LAGER, PILSNER,
ENGLISH-STYLE ALE

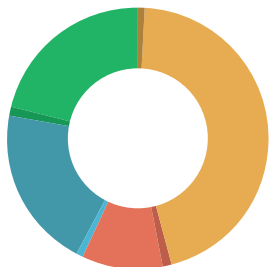
BREWING VALUES:



13-16 %

4.4-5.5 %

1-3 mL/100g



	B-Pinene	0.4 - 0.8% of total oil
	Myrcene	40 - 50% of total oil
	Linalool	0.8 - 1.0% of total oil
	Caryophyllene	9 - 11% of total oil
	Farnesene	< 1.0% of total oil
	Humulene	18 - 22% of total oil
	Geraniol	0.1 - 0.2% of total oil
	Other	14 - 31% of total oil



A BITTERING HOP

OLYMPIC

Released for commercial production in 1983, Olympic is a descendant of Brewer's Gold, Fuggle and East Kent Golding. It is primarily used as a bittering hop, however some subtle citrus and spice aroma characteristics have been noted.

COUNTRY: UNITED STATES
AROMA PROFILE: CITRUS, SPICY
BEER STYLES: AMERICAN-STYLE ALE, PALE ALE

BREWING VALUES:

ACID / OIL

RANGE

LOW

HIGH

ALPHA ACIDS (-31% CO-HUMULONE)



11.5-13.5%

BETA ACIDS



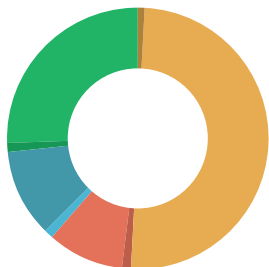
5-5.5%

TOTAL OIL



1-2 mL/100g

TOTAL OIL BREAKDOWN



B-Pinene	0.6 - 1.0% of total oil
Myrcene	45 - 55% of total oil
Linalool	0.4 - 0.7% of total oil
Caryophyllene	7 - 12% of total oil
Farnesene	< 1.0% of total oil
Humulene	9 - 13% of total oil
Geraniol	0.6 - 1.0% of total oil
Other	16 - 36% of total oil

AN AROMA HOP

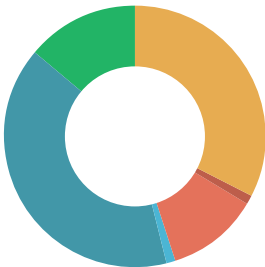
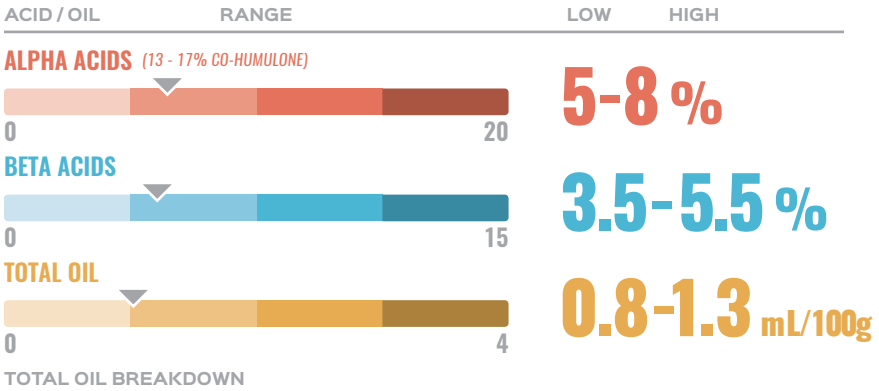
OPAL



Bred at the Hop Research Institute in Hüll, Opal is a daughter of Hallertau Gold. It is specifically known for its sweet and spicy characteristics, providing subtle pepper and clean citrus flavors.

COUNTRY: GERMANY
AROMA PROFILE: SWEET SPICE, PEPPER, CLEAN CITRUS, ANISE
BEER STYLES: BELGIAN-STYLE ALE, WHEAT, SUMMER ALE

BREWING VALUES:



Myrcene	20 - 45% of total oil
Linalool	1 - 1.5% of total oil
Caryophyllene	8 - 15% of total oil
Farnesene	< 1.0% of total oil
Humulene	30 - 50% of total oil
Other	< 1% - 40% of total oil

AN AROMA HOP

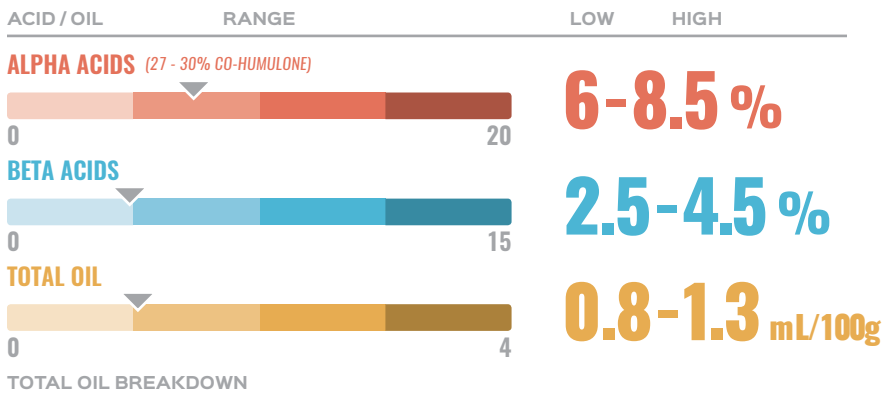
ORION



Orion is a cross between German Perle and 70/10/15M; it is a half-sister to Challenger. Acreage and availability are limited.

COUNTRY: GERMANY
AROMA PROFILE: SPICY
BEER STYLES: HELLES, DUNKEL, LAGER, PILSNER, GERMAN-STYLE ALE

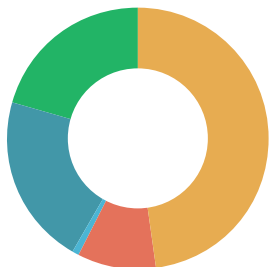
BREWING VALUES:



6-8.5%

2.5-4.5%

0.8-1.3 mL/100g



Myrcene	41 - 55% of total oil
Caryophyllene	6 - 13% of total oil
Farnesene	< 1.0% of total oil
Humulene	16 - 26% of total oil
Other	5 - 36% of total oil



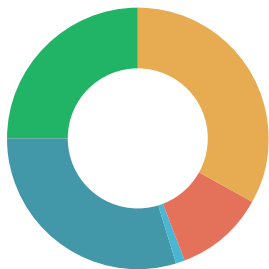
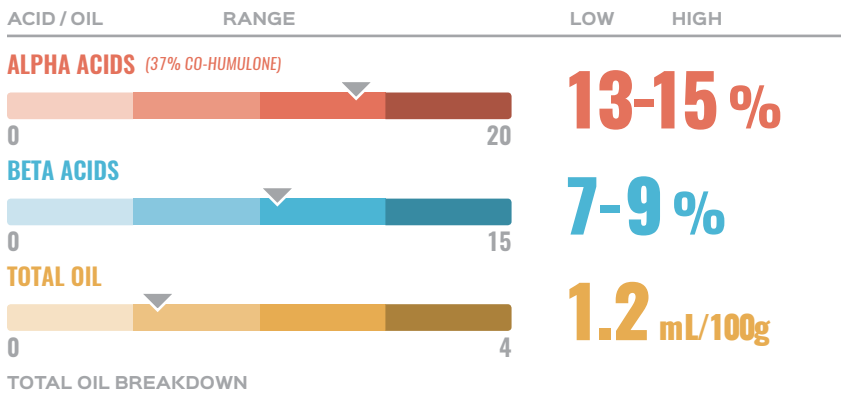
A BITTERING HOP






PACIFIC GEM

Developed by the New Zealand Institute for Plant and Food Research hop breeding program and released in 1987, Pacific Gem is a triploid alpha variety from New Zealand Smoothcone crossed with Californian Late Cluster and Fuggle. It is typically used as a first hop addition for bittering purposes, but is known for showcasing wood and blackberry flavors.

COUNTRY: NEW ZEALAND
AROMA PROFILE: OAK, BLACKBERRY
BEER STYLES: LAGER, PORTER, IPA

BREWING VALUES:



	Myrcene	33.3% of total oil
	Caryophyllene	11% of total oil
	Farnesene	0.3% of total oil
	Humulene	29.9% of total oil
	Other	26% of total oil



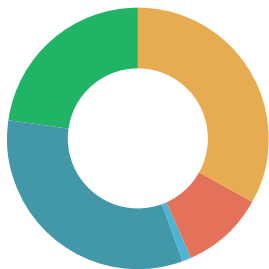
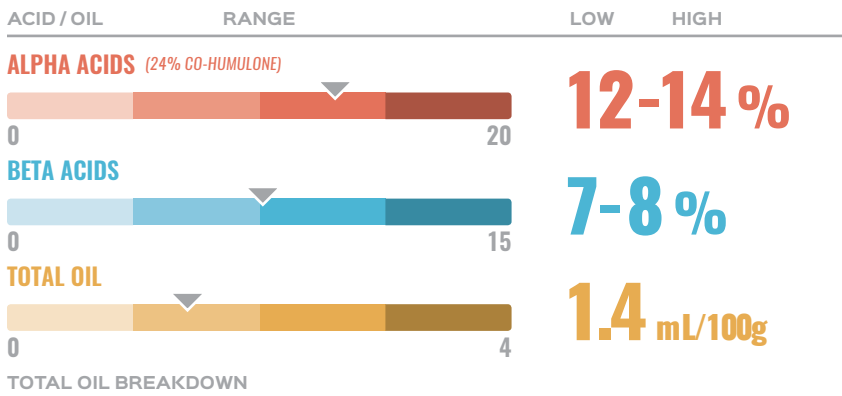
A BITTERING HOP

PACIFIC JADE

Developed by the New Zealand Institute for Plant and Food Research hop breeding program and released in 2004, Pacific Jade is a cross of New Zealand First Choice (a relative of the Late Cluster) and a Saaz male. It is suited for use as a bittering hop but also delivers bold citrus and spice aroma characteristics.

COUNTRY: **NEW ZEALAND**
AROMA PROFILE: **FRESH CITRUS, BLACK PEPPER**
BEER STYLES: **ALE, LAGER, PORTER**

BREWING VALUES:



Myrcene	33.3% of total oil
Caryophyllene	10.2% of total oil
Farnesene	0.3% of total oil
Humulene	32.9% of total oil
Other	24% of total oil



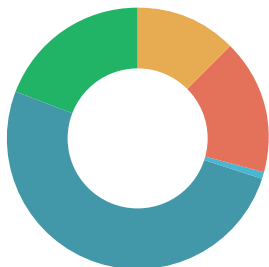
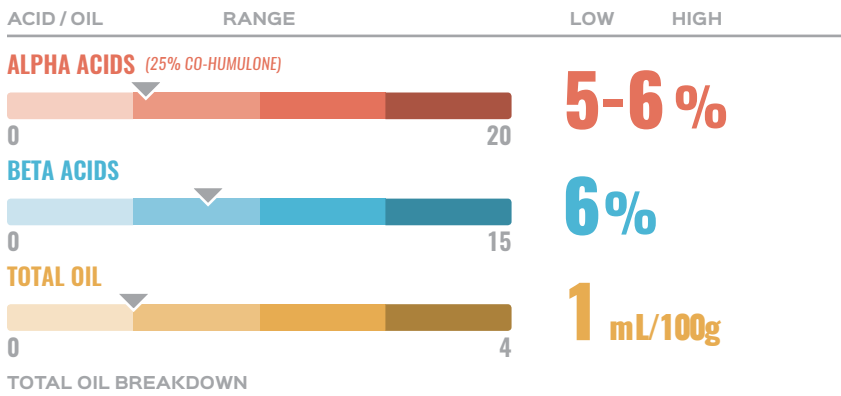
AN AROMA HOP

PACIFICA

Developed by the New Zealand Institute for Plant and Food Research hop breeding program and released in 1993, Pacifica was bred through open pollination of Hallertau Mittelfrüh. It displays classic Hallertau citrus and floral aroma characters but brings a blend of new and old-world taste descriptors to the brewers' forum.

COUNTRY: **NEW ZEALAND**
AROMA PROFILE: **ORANGE ZEST, MARMALADE**
BEER STYLES: **LAGER, PALE ALE, IPA**

BREWING VALUES:



	Myrcene	12.5% of total oil
	Caryophyllene	16.7% of total oil
	Farnesene	0.2% of total oil
	Humulene	50.9% of total oil
	Other	19% of total oil



AN AROMA HOP

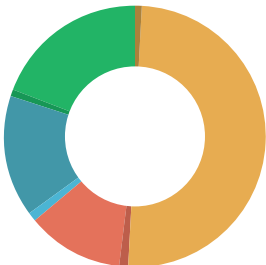
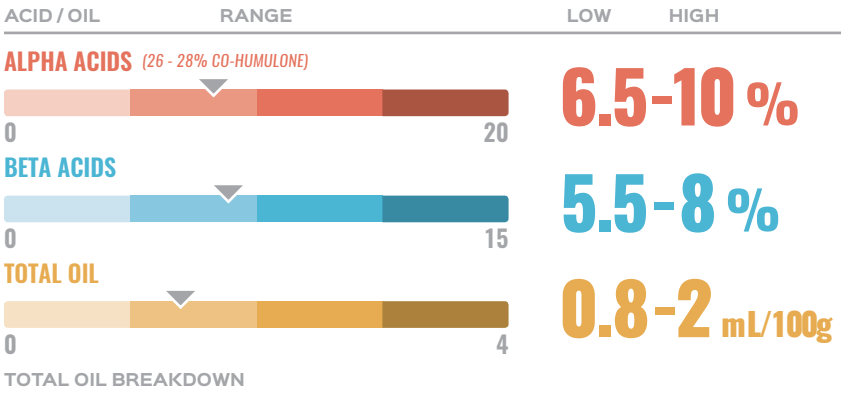
PALISADE®

YCR 4 CV

Developed by Select Botanicals Group, Palisade® is known for its high yield and unique aroma profile. With moderate alpha acid, Palisade® borders on being a dual purpose hop, however, more complex characteristics are seen in later additions.

COUNTRY: UNITED STATES
AROMA PROFILE: APRICOT, GRASS, FLORAL, CLEAN
BEER STYLES: AMERICAN-STYLE ALE,
ENGLISH-STYLE ALE, LAGER

BREWING VALUES:



	B-Pinene	0.6 - 0.8% of total oil
	Myrcene	45 - 55% of total oil
	Linalool	0.4 - 0.6% of total oil
	Caryophyllene	8 - 16% of total oil
	Farnesene	< 1.0% of total oil
	Humulene	10 - 20% of total oil
	Geraniol	0.1 - 0.5% of total oil
	Other	6 - 35% of total oil

AN AROMA HOP

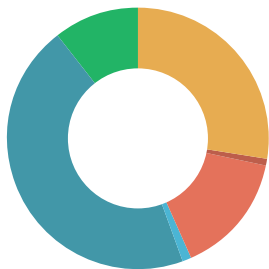
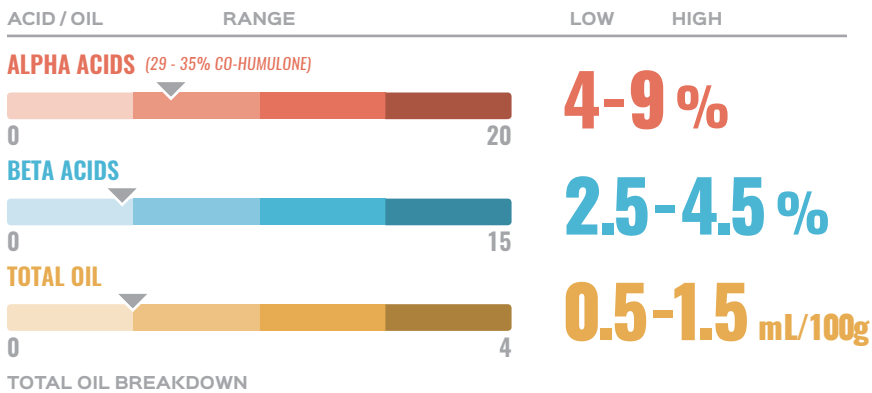
PERLE



Bred at the Hop Research Institute in Hüll and released in 1978, Perle is a descendant of Northern Brewer. It demonstrates good tolerance to most diseases, being grown in Germany and the United States.

COUNTRY: GERMANY
AROMA PROFILE: MINT, TEA, PEPPER
BEER STYLES: WHEAT, LAGER, KÖLSCH, PILSNER

BREWING VALUES:



Myrcene	20 - 35% of total oil
Linalool	0.2 - 0.6% of total oil
Caryophyllene	10 - 20% of total oil
Farnesene	< 1.0% of total oil
Humulene	35 - 55% of total oil
Other	< 1% - 34% of total oil



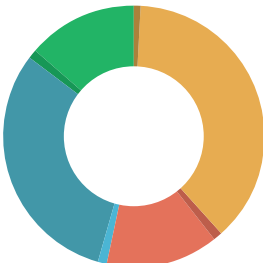
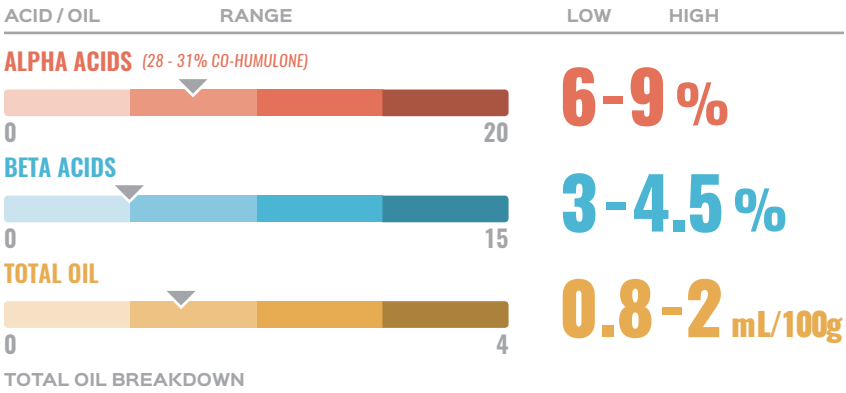
A DUAL PURPOSE HOP









PERLE

Bred at the Hop Research Institute in Hüll and released in 1978, Perle is a cross between Northern Brewer and 63/5/27M. It is tolerant to most diseases and is grown in both Germany and the United States. Perle is known for adding a traditional, German-like quality to beer.

COUNTRY: UNITED STATES
AROMA PROFILE: SPICY, FLORAL
BEER STYLES: WHEAT, LAGER, KÖLSCH, PILSNER

BREWING VALUES:



	B-Pinene	0.3 - 0.6% of total oil
	Myrcene	30 - 45% of total oil
	Linalool	0.3 - 0.8% of total oil
	Caryophyllene	12 - 16% of total oil
	Farnesene	< 1.0% of total oil
	Humulene	28 - 34% of total oil
	Geraniol	0.2 - 0.4% of total oil
	Other	2 - 28% of total oil



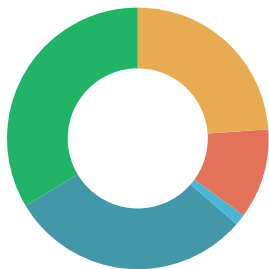
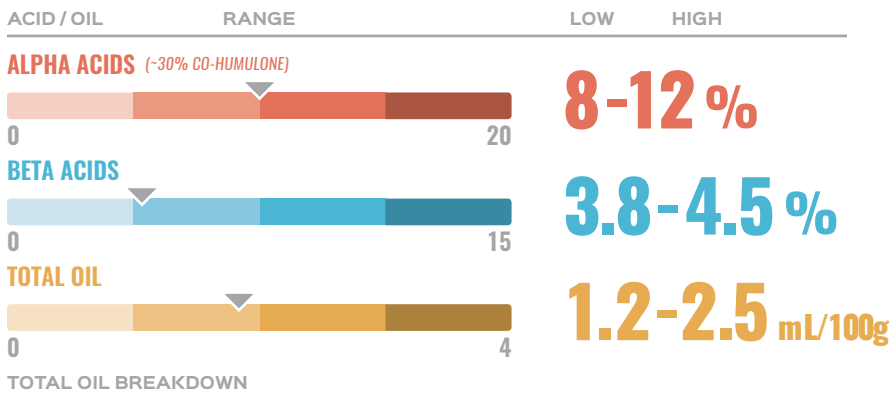
A DUAL PURPOSE HOP

PHOENIX

Bred at Wye College and released in 1996, Phoenix is a seedling of Yeoman. In brewing trials, Phoenix has produced excellent results in both bittering and flavor applications.

COUNTRY: UNITED KINGDOM
AROMA PROFILE: SPICY, FLORAL, CHOCOLATE
BEER STYLES: ENGLISH-STYLE BITTER, PALE ALE, STOUT, HELLES, LAGER, SAISON

BREWING VALUES:



Myrcene	~24% of total oil
Caryophyllene	~11% of total oil
Farnesene	~1.5% of total oil
Humulene	~30% of total oil
Other	34 - 75% of total oil



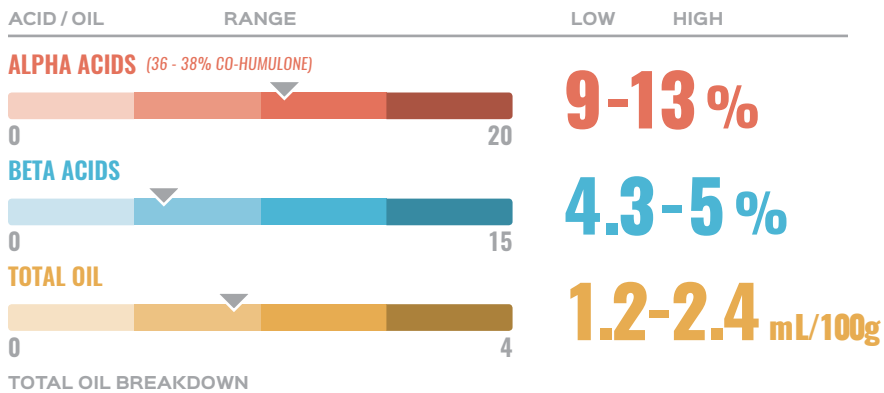
A DUAL PURPOSE HOP

PILGRIM

Bred at Wye College in the late 1990s and released in 2001, Pilgrim is half-sister to First Gold and sister to Herald. It is often compared to Target. Pilgrim's selinene content helps enhance brewing performance and produce a "hoppier" aroma.

COUNTRY: UNITED KINGDOM
AROMA PROFILE: LEMON, GRAPEFRUIT, PEAR, BERRY
BEER STYLES: ALE, WHEAT, STOUT, HELLES, LAGER

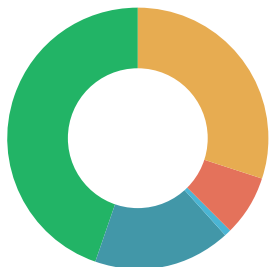
BREWING VALUES:



9-13%

4.3-5%

1.2-2.4 mL/100g



Myrcene	30% of total oil
Caryophyllene	7 - 8% of total oil
Farnesene	0.3% of total oil
Humulene	17% of total oil
Other	45 - 46% of total oil



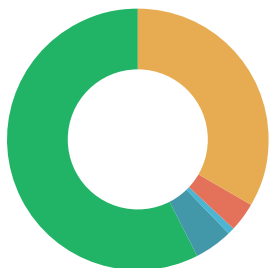
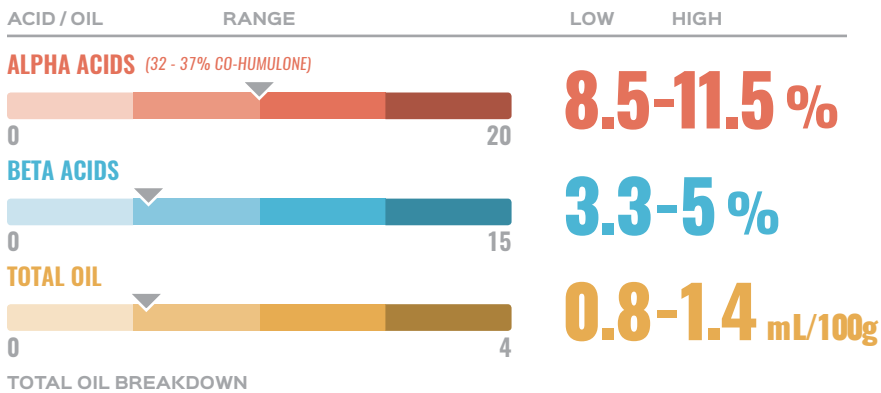
A DUAL PURPOSE HOP

PILOT

Bred at Wye College and released in 2001, Pilot is a result of open pollination of Pioneer. It is known for its distinct marmalade flavor and complete aroma profile being distinctively different than other UK varieties.

COUNTRY: UNITED KINGDOM
AROMA PROFILE: MARMALADE, LEMON, SPICE
BEER STYLES: AMERICAN-STYLE ALE,
ENGLISH-STYLE ALE

BREWING VALUES:



Myrcene	30 - 37% of total oil
Caryophyllene	3 - 4% of total oil
Farnesene	< 1.0% of total oil
Humulene	3 - 6% of total oil
Other	52 - 63% of total oil



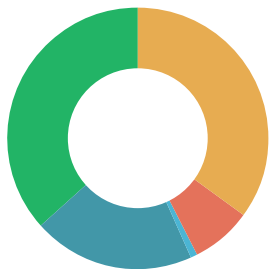
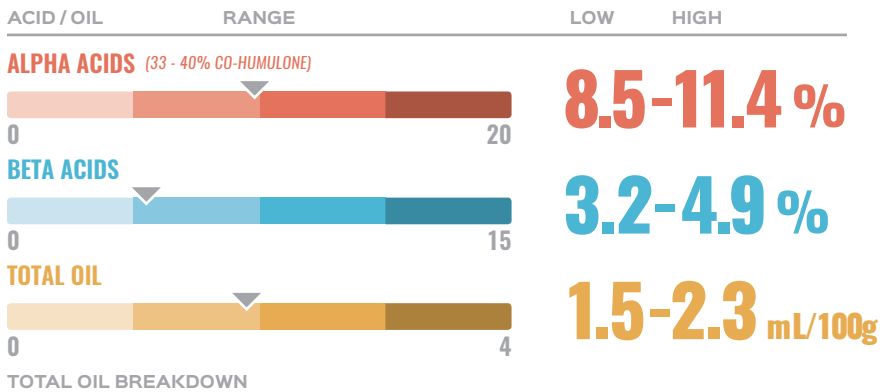
A DUAL PURPOSE HOP

PIONEER

Bred at Wye College and released in 1996, Pioneer is a sister to Herald. It displays a distinctly "hoppy" aroma with crisp and refreshing bittering characteristics.

COUNTRY: UNITED KINGDOM
AROMA PROFILE: LEMON, GRAPEFRUIT, CEDAR, HERBAL
BEER STYLES: ENGLISH-STYLE BITTER, ENGLISH-STYLE ALE, RED ALE

BREWING VALUES:



Myrcene	28 - 42% of total oil
Caryophyllene	6 - 9% of total oil
Farnesene	< 1.0% of total oil
Humulene	16 - 24% of total oil
Other	24 - 49% of total oil

A DUAL PURPOSE HOP

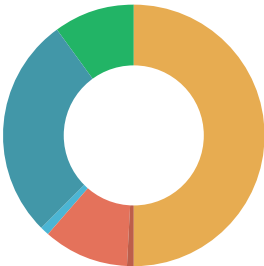
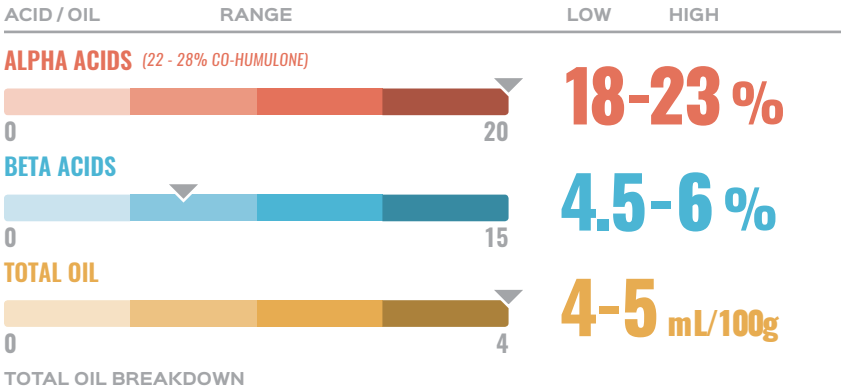
POLARIS



Bred at the Hop Research Institute in Hüll and released in 2012, Polaris was commercialized as a new, German variety in response to growing demand from the craft beer industry for distinct flavor profiles. It features extremely high alpha content along with intense mint flavors.

COUNTRY: GERMANY
AROMA PROFILE: MINT, PINEAPPLE, MENTHOL
BEER STYLES: STOUT, IPA, DOUBLE IPA

BREWING VALUES:



Myrcene	~50% of total oil
Linalool	0.1 - 0.4% of total oil
Caryophyllene	8 - 13% of total oil
Farnesene	< 1.0% of total oil
Humulene	20 - 35% of total oil
Other	1 - 21% of total oil

AN AROMA HOP

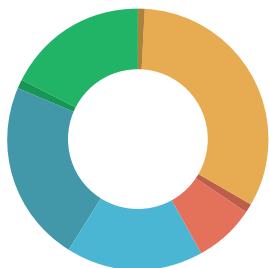
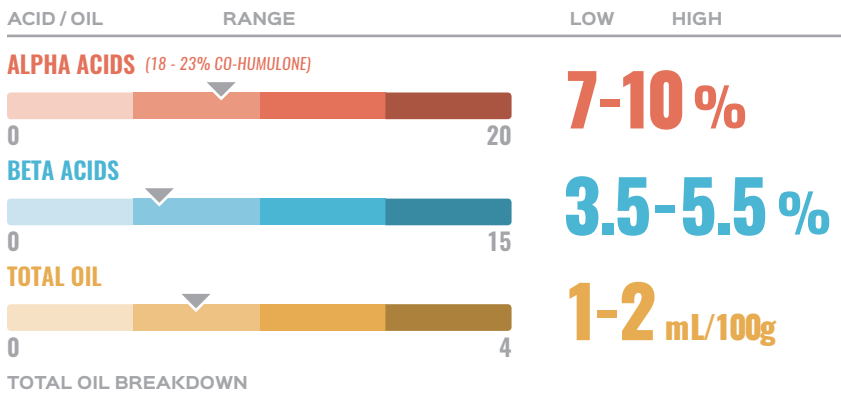
PREMIANT











Bred from Saaz and released in 1996, Premiant has a relatively high alpha content for Czech varieties. As a result, it has found some application as a dual purpose variety.

COUNTRY: CZECH REPUBLIC
AROMA PROFILE: PLEASANT, MILD
BEER STYLES: ALE, LAGER, SAISON

BREWING VALUES:



	B-Pinene	0.4 - 0.7% of total oil
	Myrcene	30 - 45% of total oil
	Linalool	0.4 - 0.7% of total oil
	Caryophyllene	9 - 13% of total oil
	Farnesene	1 - 3% of total oil
	Humulene	25 - 40% of total oil
	Geraniol	0.02 - 0.1% of total oil
	Other	< 1% - 34% of total oil



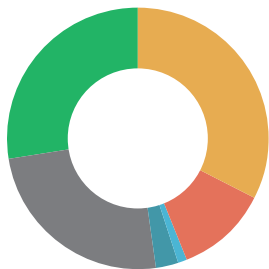
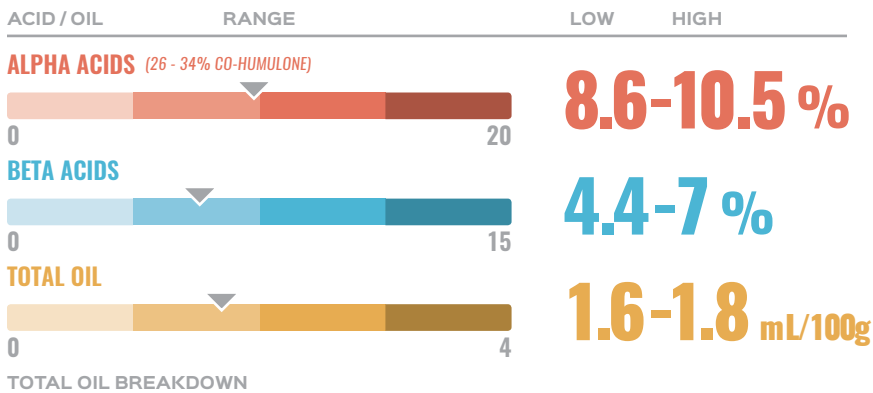
A DUAL PURPOSE HOP

PRIDE OF RINGWOOD

Bred in 1953 and commercially grown since the 1960s. One of Australia's most known and utilized hop varieties. Predominantly used for early kettle additions.

COUNTRY: AUSTRALIA
AROMA PROFILE: CEDAR, OAK
BEER STYLES: LAGER, PALE ALE

BREWING VALUES:



Myrcene	24 - 41% of total oil
Caryophyllene	9 - 14% of total oil
Farnesene	< 1.0% of total oil
Humulene	2 - 4% of total oil
Other	10 - 45% of total oil
Selinene	19 - 30% of total oil



AN AROMA HOP

PROGRESS

Bred at Wye College in 1951 and released in 1964, Progress is a cross between WGV (Whitbread Golding Variety) and a wild, American male hop. It was originally introduced as an alternative to Fuggle, but showcases a slightly sweeter aroma.

COUNTRY: UNITED KINGDOM

AROMA PROFILE: GRASS, MINT, SWEET, HONEY, BLACKCURRANT

BEER STYLES: ENGLISH-STYLE ALE, PORTER, STOUT, ENGLISH-STYLE BITTER

BREWING VALUES:

ACID / OIL

RANGE

LOW

HIGH

ALPHA ACIDS (25 - 30% CO-HUMULONE)



6-7.5%

BETA ACIDS



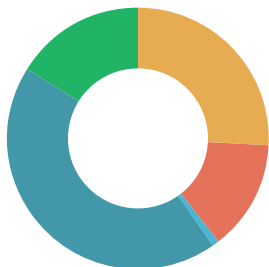
2-2.7%

TOTAL OIL



0.5-0.8 mL/100g

TOTAL OIL BREAKDOWN



Myrcene	24 - 28% of total oil
Caryophyllene	12 - 15% of total oil
Farnesene	< 1.0% of total oil
Humulene	40 - 47% of total oil
Other	9 - 23% of total oil



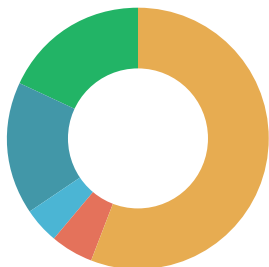
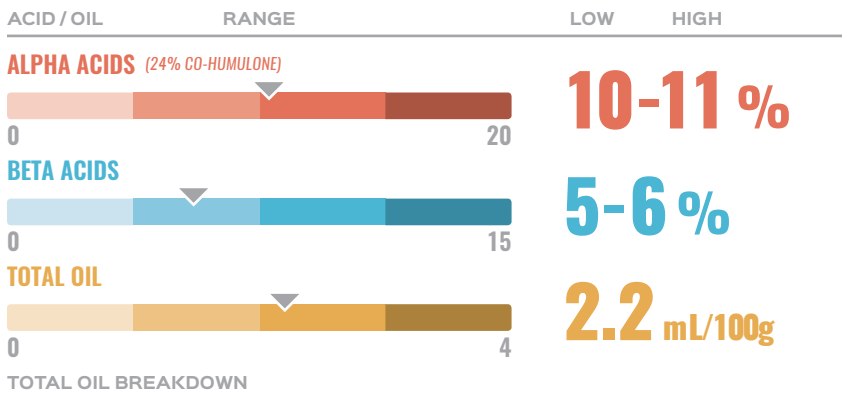
A DUAL PURPOSE HOP

RAKAU

Re-released in 2007 from the New Zealand hop breeding program, Rakau is often described as “the whole orchard.” It is often used in New World styles where brash fruity character and big but well constructed bitterness is desired. Rakau performs best when used in combination of late additions and dry hopping.

COUNTRY: **NEW ZEALAND**
AROMA PROFILE: **STONE FRUIT, FIG, APRICOT, RESIN, PINE NEEDLE**
BEER STYLES: **IPA, LAGER, PALE ALE**

BREWING VALUES:



Myrcene	56% of total oil
Caryophyllene	5.2% of total oil
Farnesene	4.5% of total oil
Humulene	16.3% of total oil
Other	18% of total oil



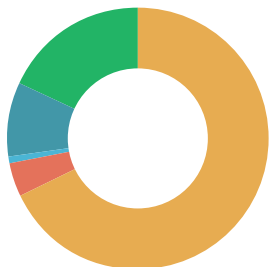
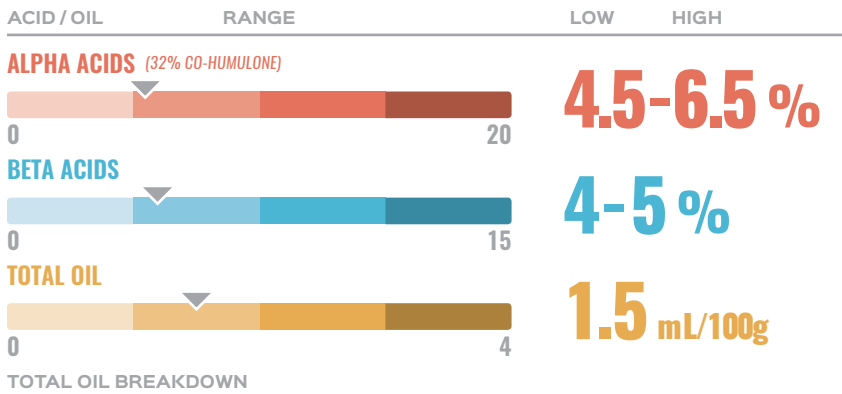
AN AROMA HOP

RIWAKA

Developed by the New Zealand Institute for Plant and Food Research hop breeding program and released in 1996, Riwaka is a triploid aroma variety bred from "Old Line" Saaz and New Zealand breeding selections. It is a quintessential New Zealand variety. Riwaka is a bold, fruity hop that is best suited for IPA and Imperial beer styles.

COUNTRY: **NEW ZEALAND**
AROMA PROFILE: **GRAPEFRUIT, CITRUS**
BEER STYLES: **IPA, DOUBLE IPA, PILSNER**

BREWING VALUES:



Myrcene	68% of total oil
Caryophyllene	4% of total oil
Farnesene	1% of total oil
Humulene	9% of total oil
Other	18% of total oil

AN AROMA HOP

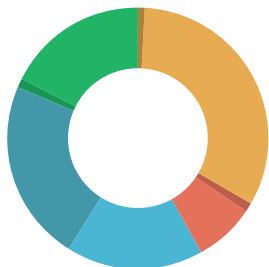
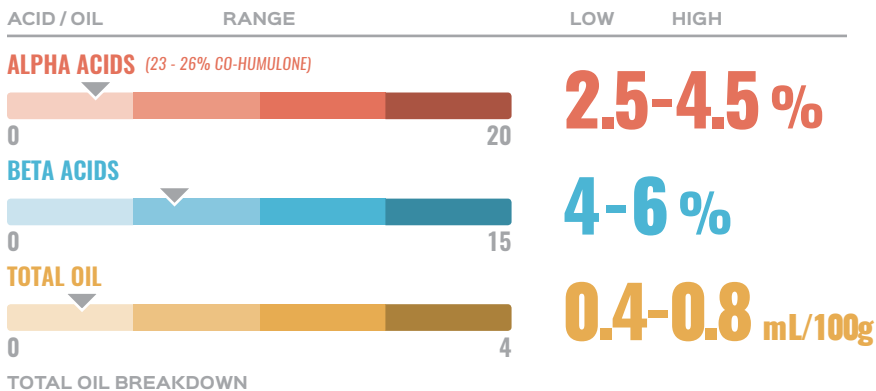
SAAZ



A Czech Republic landrace variety, Saaz is the most classic “noble” aroma hop with longstanding and strong traditions. It is associated with and defines Czech-style pilsners.

COUNTRY: CZECH REPUBLIC
AROMA PROFILE: PLEASANT, MILD
BEER STYLES: PILSNER, LAGER,
BELGIAN-STYLE ALE

BREWING VALUES:



	B-Pinene	0.4 - 0.8% of total oil
	Myrcene	25 - 40% of total oil
	Linalool	0.4 - 0.6% of total oil
	Caryophyllene	6 - 9% of total oil
	Farnesene	14 - 20% of total oil
	Humulene	15 - 30% of total oil
	Geraniol	0.1 - 0.2% of total oil
	Other	< 1% - 39% of total oil



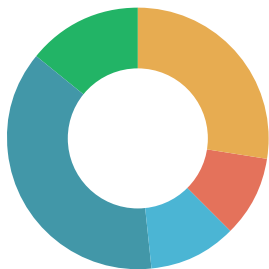
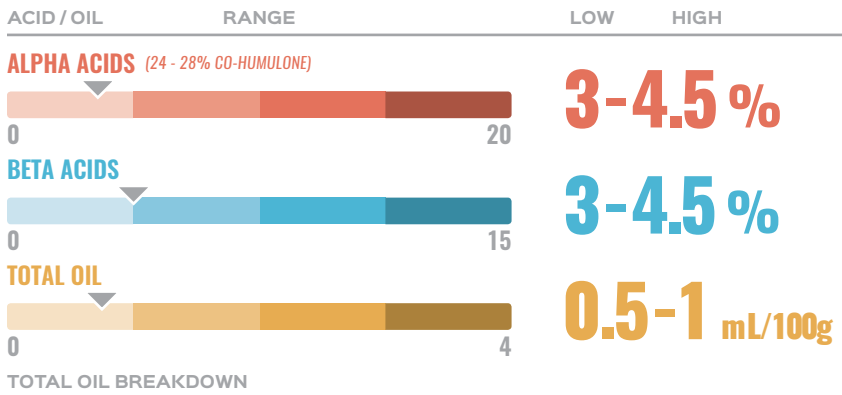
AN AROMA HOP






SAAZ

As the US equivalent of the longstanding, Czech Republic landrace variety, Saaz is the most classic "noble" aroma hop with longstanding and strong traditions.

COUNTRY: UNITED STATES
AROMA PROFILE: EARTHY, SPICY
BEER STYLES: LAGER, PILSNER, WHEAT
BELGIAN-STYLE ALE

BREWING VALUES:



	Myrcene	25 - 30% of total oil
	Caryophyllene	9 - 11% of total oil
	Farnesene	9 - 13% of total oil
	Humulene	35 - 40% of total oil
	Other	6 - 22% of total oil



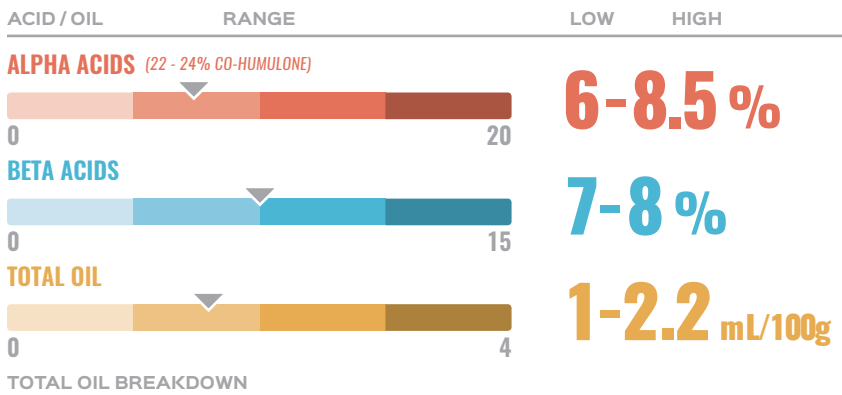
AN AROMA HOP

SANTIAM

Released in 1997 by the USDA, Santiam is a triploid selection from Tettnang, Hallertau Mittelfrüh and a cultivar derived from Cascade. It is an American aroma variety with noble hop characteristics.

COUNTRY: UNITED STATES
AROMA PROFILE: BLACK PEPPER, SPICY, FLORAL
BEER STYLES: BELGIAN-STYLE ALE, PILSNER, BOCK, HELLES, LAGER

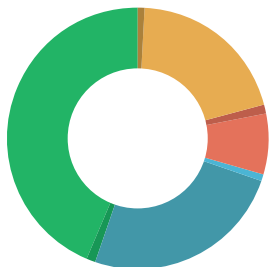
BREWING VALUES:



6-8.5%

7-8%

1-2.2 mL/100g



	B-Pinene	0.2 - 0.4% of total oil
	Myrcene	15 - 25% of total oil
	Linalool	0.8 - 1.2% of total oil
	Caryophyllene	6 - 9% of total oil
	Farnesene	14 - 18% of total oil
	Humulene	20 - 30% of total oil
	Geraniol	0.0 - 0.3% of total oil
	Other	16 - 44% of total oil

AN AROMA HOP

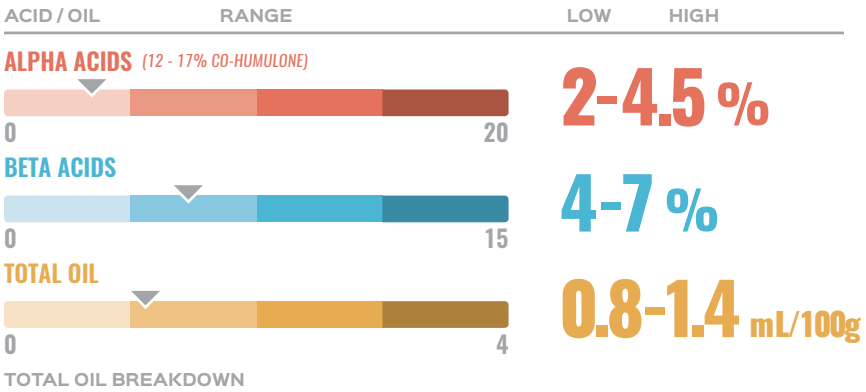
SAPHIR



Bred at the Hop Research Institute in Hüll and released in 2002, Saphir is an aroma variety with a distinct hoppy tang.

COUNTRY: GERMANY
AROMA PROFILE: SPICY, FLORAL
BEER STYLES: GERMAN-STYLE LAGER, WHEAT, BELGIAN-STYLE ALE, PILSNER

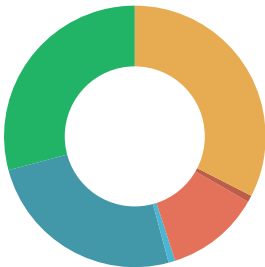
BREWING VALUES:



2-4.5%

4-7%

0.8-1.4 mL/100g



Myrcene	25 - 40% of total oil
Linalool	0.8 - 1.3% of total oil
Caryophyllene	9 - 14% of total oil
Farnesene	< 1.0% of total oil
Humulene	20 - 30% of total oil
Other	14 - 44% of total oil



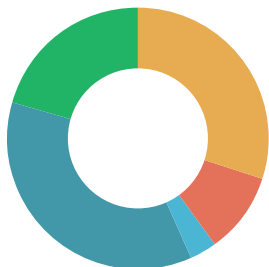
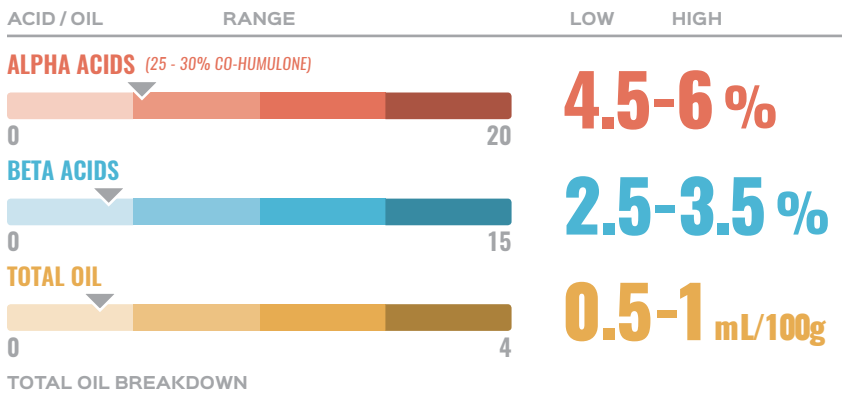
AN AROMA HOP

SAVINJSKI GOLDING

Originating from UK Fuggle, Styrian Savinjski Golding is a traditional Slovenian variety with pleasant bittering and noble aroma characteristics.

COUNTRY: SLOVENIA
AROMA PROFILE: NOBLE
BEER STYLES: ALE, LAGER, STOUT, BITTER, BARLEY WINE

BREWING VALUES:



Myrcene	27 - 33% of total oil
Caryophyllene	9 - 11% of total oil
Farnesene	2 - 5% of total oil
Humulene	34 - 38% of total oil
Other	13 - 28% of total oil

AN AROMA HOP

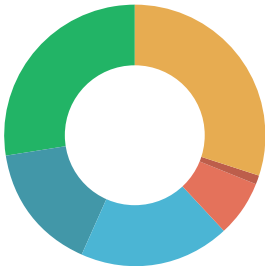
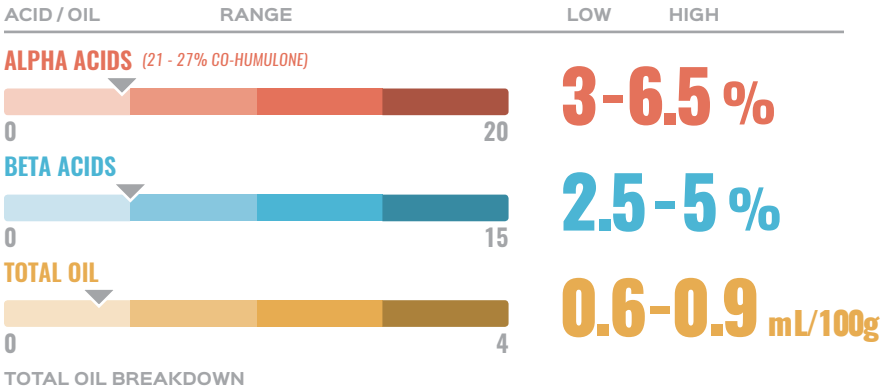
SELECT



Bred at the Hop Research Center in Hüll and released in 1993, Select is often referred to as "Spalter Select." It was bred to be like the Spalt, Tettnang, and Saaz groups.

COUNTRY: GERMANY
AROMA PROFILE: SPICY, GRASS
BEER STYLES: LAGER, GERMAN-STYLE ALE

BREWING VALUES:



Myrcene	20 - 40% of total oil
Linalool	1 - 1.5% of total oil
Caryophyllene	4 - 10% of total oil
Farnesene	15 - 22% of total oil
Humulene	10 - 22% of total oil
Other	5 - 50% of total oil



A DUAL PURPOSE HOP

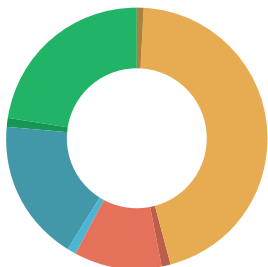
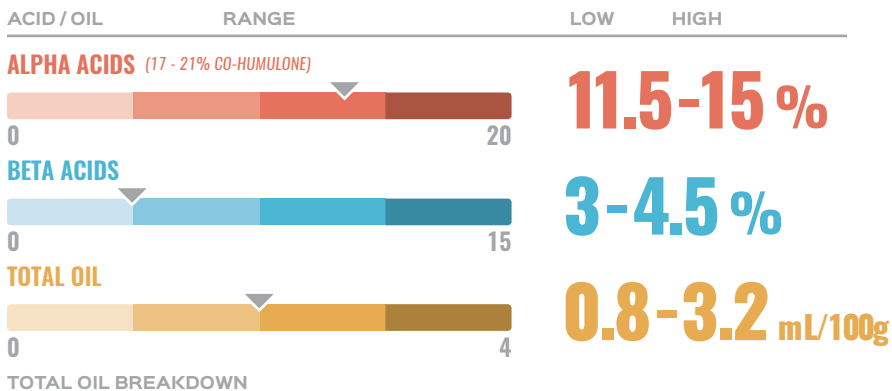
SIMCOE®

YCR 14 CV

Developed by Select Botanicals Group and released in 2000, Simcoe® is known for its brewing versatility and unique aroma characteristics. It continues to rise in popularity becoming one of the top ten varieties in the craft and home brewing industries.

COUNTRY: UNITED STATES
AROMA PROFILE: PASSION FRUIT, BERRY, PINE, EARTH, CITRUS
BEER STYLES: IPA, PALE ALE, WHEAT, SAISON, AMBER

BREWING VALUES:



	B-Pinene	0.5 - 1.0% of total oil
	Myrcene	40 - 50% of total oil
	Linalool	0.5 - 0.9% of total oil
	Caryophyllene	8 - 14% of total oil
	Farnesene	< 1.0% of total oil
	Humulene	15 - 20% of total oil
	Geraniol	0.8 - 1.2% of total oil
	Other	12 - 34% of total oil

AN AROMA HOP

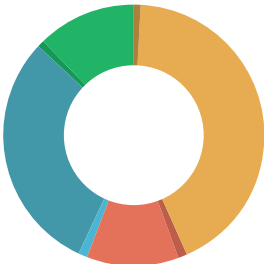
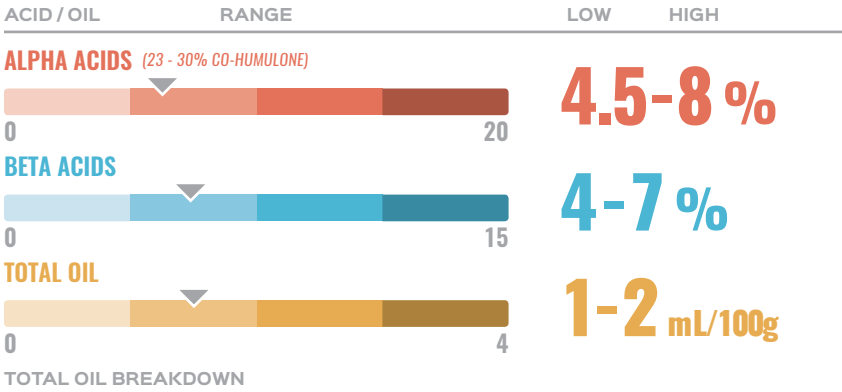
SLÁDEK



A hybrid aroma variety of Saaz-type and Northern Brewer, Sládek displays noble characteristics with a fruity twist. Its name is derived from the Czech word meaning “beer brewer.” Sládek is noted to be a good complement to Saaz in late-hopping applications.

COUNTRY: CZECH REPUBLIC
AROMA PROFILE: PEACH, GRAPEFRUIT, PASSION FRUIT
BEER STYLES: IPA, PILSNER, BLONDE ALE

BREWING VALUES:



	B-Pinene	0.5 - 0.8% of total oil
	Myrcene	35 - 50% of total oil
	Linalool	0.15 - 0.3% of total oil
	Caryophyllene	9 - 14% of total oil
	Farnesene	< 1.0% of total oil
	Humulene	20 - 40% of total oil
	Geraniol	0.1 - .25% of total oil
	Other	< 1% - 34% of total oil

AN AROMA HOP

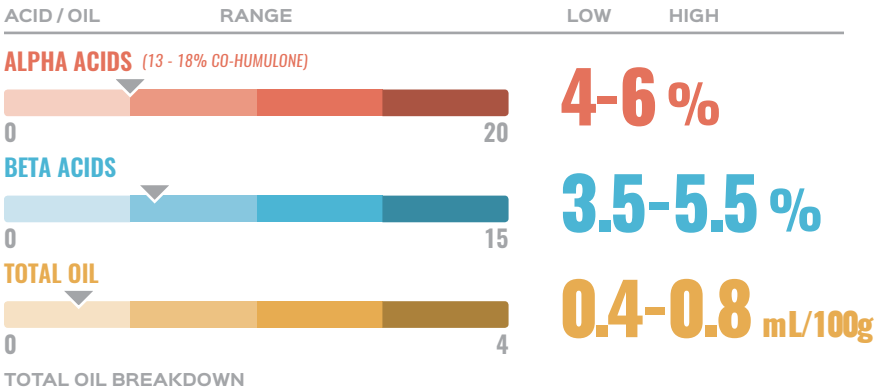
SMARAGD



Bred at the Hop Research Institute in Hüll, Smaragd is a fine aroma variety with many noble characteristics. It was formerly known as Emerald.

COUNTRY: GERMANY
AROMA PROFILE: ANISE, TOBACCO, CLOVE
BEER STYLES: ALE, ALTBIER, KÖLSCH

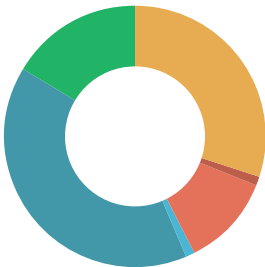
BREWING VALUES:



4-6 %

3.5-5.5 %

0.4-0.8 mL/100g



Myrcene	20 - 40% of total oil
Linalool	0.8 - 1.4% of total oil
Caryophyllene	9 - 14% of total oil
Farnesene	< 1.0% of total oil
Humulene	30 - 50% of total oil
Other	< 1% - 39% of total oil



A DUAL PURPOSE HOP

SORACHI ACE

Developed in Japan in 1984 for Sapporo Breweries, Ltd., Sorachi Ace is a cross between Brewer's Gold, Saaz and Beikei No. 2 male. It is available in limited quantities, however, it remains a popular variety among craft brewers for its unique citrus fruit, herbal and dill aromas.

COUNTRY: UNITED STATES
AROMA PROFILE: LEMON, LIME, DILL
BEER STYLES: IPA, PALE ALE, LAGER,
BELGIAN-STYLE ALE

BREWING VALUES:

ACID / OIL RANGE LOW HIGH

ALPHA ACIDS (25 - 28% CO-HUMULONE)



11.5-14.5%

BETA ACIDS



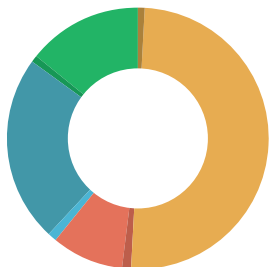
6-7.5%

TOTAL OIL



1.5-3 mL/100g

TOTAL OIL BREAKDOWN



B-Pinene	0.5 - 0.8% of total oil
Myrcene	45 - 55% of total oil
Linalool	0.3 - 0.5% of total oil
Caryophyllene	7 - 11% of total oil
Farnesene	2 - 5% of total oil
Humulene	20 - 26% of total oil
Geraniol	0.1 - 0.5% of total oil
Other	1 - 25% of total oil



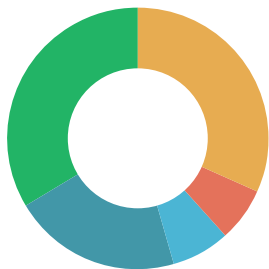
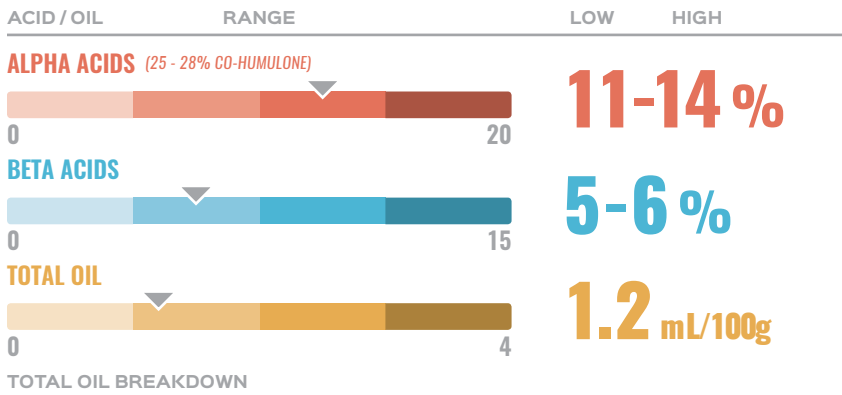
A DUAL PURPOSE HOP

SOUTHERN CROSS

Developed by the New Zealand Institute for Plant and Food Research hop breeding program and released in 1994, Southern Cross is a triploid cross between New Zealand Smoothcone and a 1950's research variety bred from a crossing of Californian and English Fuggle. It has excellent essential oils and low co-humulone delivering a delicate balance of citrus and spice when added at the end of boil.

COUNTRY: NEW ZEALAND
AROMA PROFILE: LEMON PEEL, LIME, TROPICAL FRUIT, PINE
BEER STYLES: PALE ALE, LAGER,

BREWING VALUES:



Myrcene	31.8% of total oil
Caryophyllene	6.7% of total oil
Farnesene	7.3% of total oil
Humulene	20.8% of total oil
Other	33% of total oil



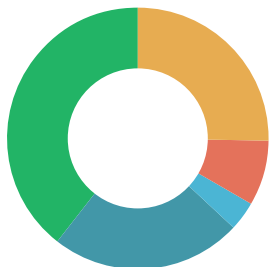
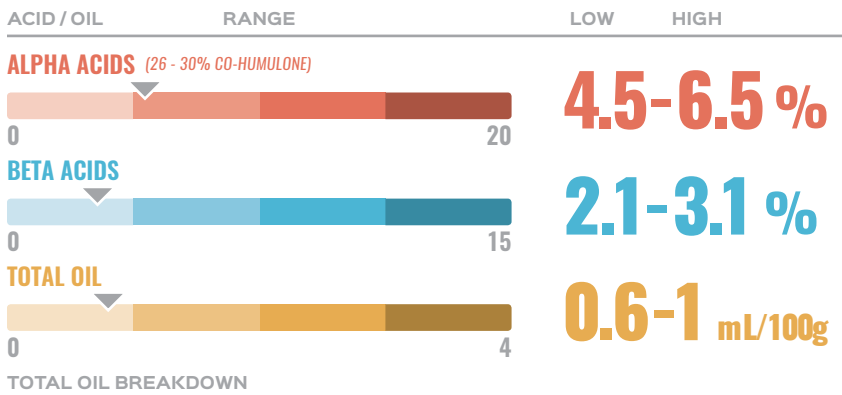
AN AROMA HOP

SOVEREIGN

Bred at Wye College in 1995 and released in 2004, Sovereign is a dwarf variety bred by open pollination. It is a granddaughter of Pioneer. Sovereign is often used in conjunction with Goldings in English-style beers.

COUNTRY: UNITED KINGDOM
AROMA PROFILE: FLORAL, GRASS, HERBAL, MINT, SWEET, PEAR
BEER STYLES: ENGLISH-STYLE BITTER, PALE ALE

BREWING VALUES:



Myrcene	20 - 31% of total oil
Caryophyllene	8% of total oil
Farnesene	3.6% of total oil
Humulene	20 - 27% of total oil
Other	30 - 56% of total oil

AN AROMA HOP

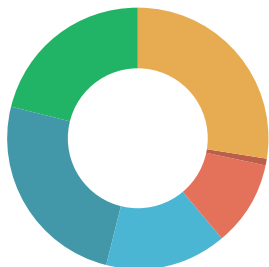
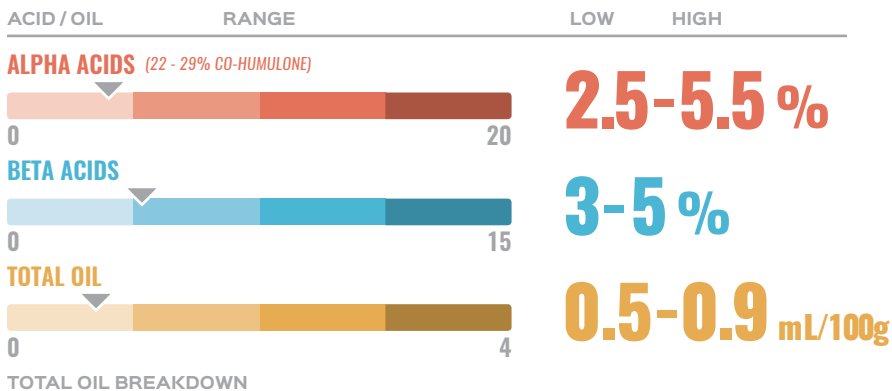
SPALT



A landrace variety originating from the Spalt region in Southern Germany, Spalt (or Spalter) is an aroma variety with characteristics similar to German Tettang. It belongs to the Saaz group and displays fine, noble characteristics.

COUNTRY: GERMANY
AROMA PROFILE: NOBLE
BEER STYLES: LAGER, ALTBIER, BOCK, HELLES, PILSNER

BREWING VALUES:



Myrcene	20 - 35% of total oil
Linalool	0.5 - 0.8% of total oil
Caryophyllene	8 - 13% of total oil
Farnesene	12 - 18% of total oil
Humulene	20 - 30% of total oil
Other	3 - 40% of total oil



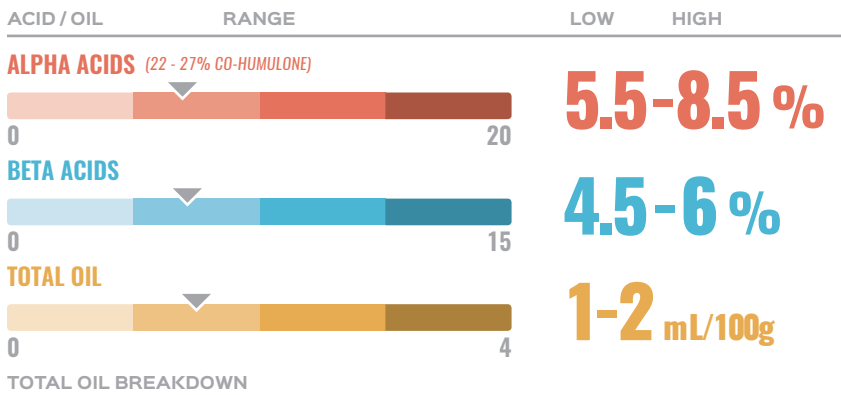
AN AROMA HOP

STERLING

Bred in 1990 and released in 1998, Sterling is an aroma variety with noble hop characteristics. Its lineage includes Saaz, Cascade, Brewer's Gold and Early Green.

COUNTRY: UNITED STATES
AROMA PROFILE: NOBLE, HERBAL, SPICY, FLORAL
BEER STYLES: LAGER, WHEAT, PILSNER

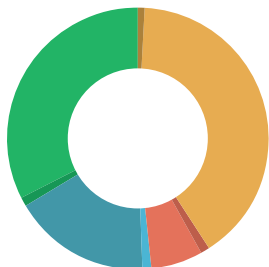
BREWING VALUES:



5.5-8.5%

4.5-6%

1-2 mL/100g



	B-Pinene	0.3 - 0.6% of total oil
	Myrcene	35 - 45% of total oil
	Linalool	0.6 - 0.9% of total oil
	Caryophyllene	5 - 8% of total oil
	Farnesene	15 - 19% of total oil
	Humulene	16 - 18% of total oil
	Geraniol	0.2 - 0.4% of total oil
	Other	8 - 28% of total oil



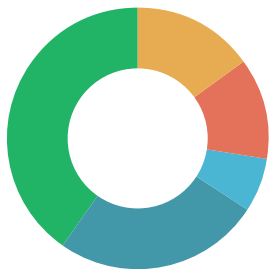
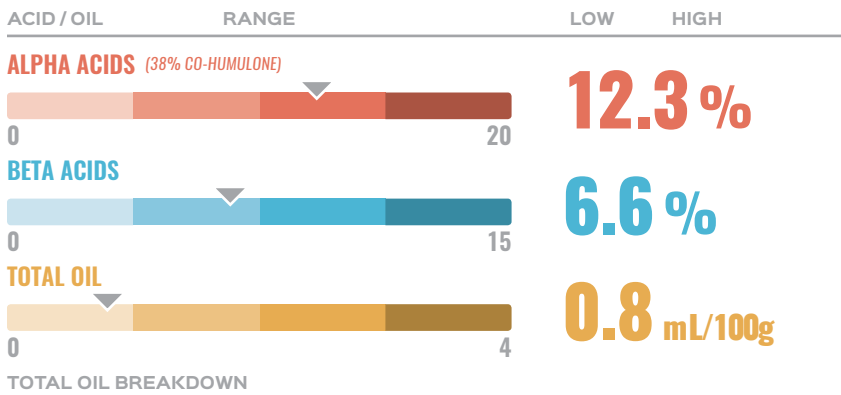
A DUAL PURPOSE HOP

STICKLEBRACT

Developed by New Zealand Horticultural Research Center at Riwaka (now New Zealand Institute for Plant and Food Research) and released in 1972, Sticklebract is a result of open pollination of New Zealand First Choice. It was originally released as a high alpha bittering hop, but has become a dual purpose variety characterized by citrus and pine flavors.

COUNTRY: **NEW ZEALAND**
AROMA PROFILE: **CITRUS, PINE**
BEER STYLES: **ENGLISH-STYLE BITTER, IPA, ENGLISH PALE ALE, PILSNER**

BREWING VALUES:



Myrcene	15.1% of total oil
Caryophyllene	12.6% of total oil
Farnesene	6.7% of total oil
Humulene	25.5% of total oil
Other	40% of total oil

AN AROMA HOP

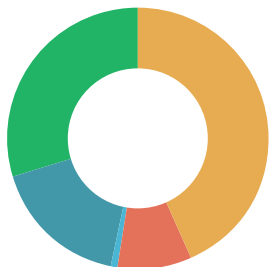
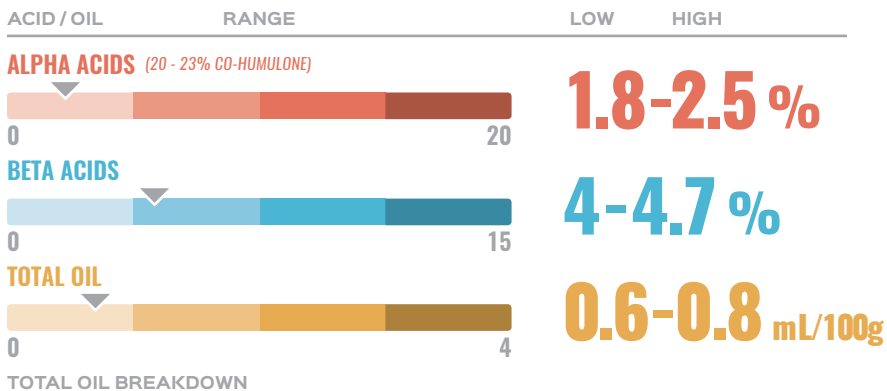
STRISSEL- SPALT



A traditional landrace variety from the Alsace region in France, near Strasbourg, Strisselspalt is globally accepted as a classic, noble variety. Its aroma is delicate with floral, spicy, herbal and subtle citrus notes.

COUNTRY: FRANCE
AROMA PROFILE: HERBAL, GRASS, FLORAL, SPICY, GRAPEFRUIT
BEER STYLES: SAISON, BIÈRE DE GARDE, LAGER, BELGIAN-STYLE PALE ALE

BREWING VALUES:



Myrcene	35 - 52% of total oil
Caryophyllene	8 - 10% of total oil
Farnesene	< 1.0% of total oil
Humulene	13 - 21% of total oil
Other	16 - 43% of total oil



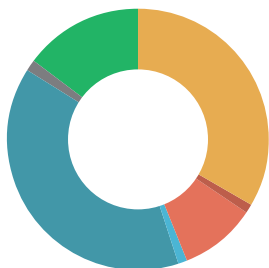
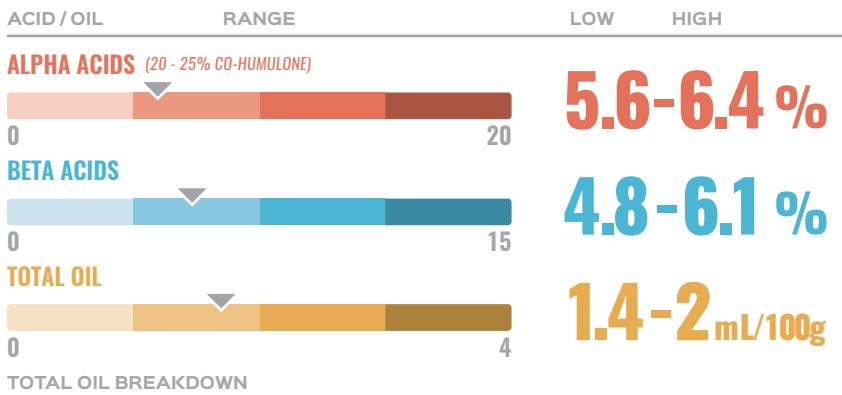
A DUAL PURPOSE HOP

SUMMER™

Bred in 1997 at Tasmanian Bushy Park Breeding Garden, Summer™ is the result of open pollination of a tetraploid Czech Saaz. It features balanced citrus and stone fruit flavors, but showcases distinct apricot and melon characteristics in dry hopping applications.

COUNTRY: AUSTRALIA
AROMA PROFILE: APRICOT, MELON
BEER STYLES: ALE, LAGER, PILSNER

BREWING VALUES:



Myrcene	29 - 38% of total oil
Linalool	0.2 - 0.6% of total oil
Caryophyllene	8 - 11% of total oil
Farnesene	< 1.0% of total oil
Humulene	28 - 50% of total oil
Other	< 1% - 33% of total oil
Selinene	1 - 2% of total oil



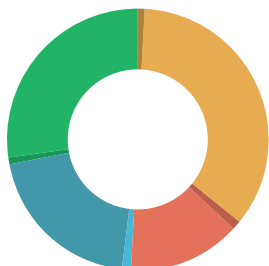
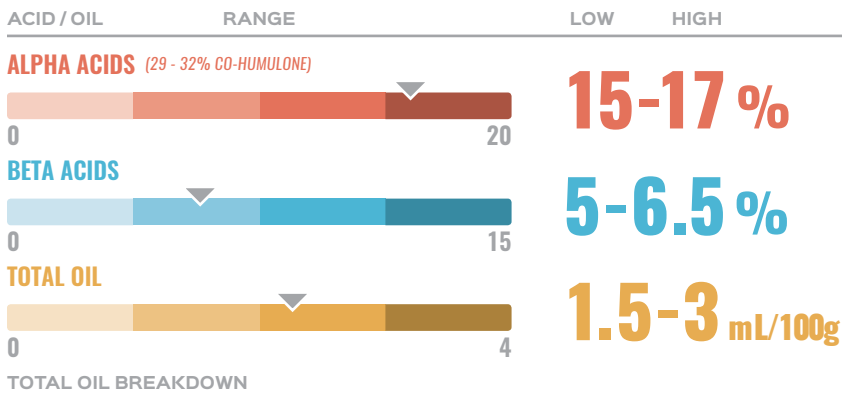
A BITTERING HOP









SUMMIT™

Bred by the American Dwarf Hop Association and released in 2003, Summit™ is a cross between Lexus and an unspecified male derived from numerous hops including Zeus, Nugget and male USDA varieties. It is the first dwarf hop to be bred for production in the United States. Summit™ is mainly used as a bittering hop, but does have earthy aromatic characteristics and subtle hints of citrus.

COUNTRY: UNITED STATES
AROMA PROFILE: PEPPER, INCENSE, ANISE, ORANGE, PINK GRAPEFRUIT, TANGERINE
BEER STYLES: IPA, DOUBLE IPA, PALE ALE, WHEAT

BREWING VALUES:



	B-Pinene	0.3 - 0.6% of total oil
	Myrcene	30 - 40% of total oil
	Linalool	0.2 - 0.4% of total oil
	Caryophyllene	12 - 16% of total oil
	Farnesene	< 1.0% of total oil
	Humulene	18 - 22% of total oil
	Geraniol	0.1 - 0.6% of total oil
	Other	19 - 38% of total oil



A BITTERING HOP

SUPER PRIDE

Bred in 1987 at the Rostrevor Breeding Garden in Victoria and released in 1995, Super Pride is a daughter of Pride of Ringwood. It is predominantly used as a bittering hop, but offers a subtle resin and fruit characteristic as well.

COUNTRY: AUSTRALIA
AROMA PROFILE: RESIN, FRUIT
BEER STYLES: BOCK, PALE ALE, LAGER, IPA

BREWING VALUES:

ACID / OIL RANGE LOW HIGH

ALPHA ACIDS (26 - 29% CO-HUMULONE)



12.5-16.3%

BETA ACIDS



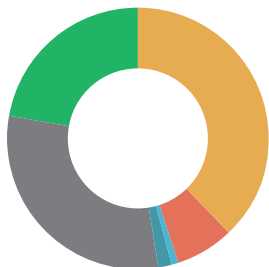
6-8%

TOTAL OIL



3.4-4 mL/100g

TOTAL OIL BREAKDOWN



Myrcene	34 - 42% of total oil
Caryophyllene	5 - 9% of total oil
Farnesene	< 1.0% of total oil
Humulene	1 - 2% of total oil
Other	6 - 38% of total oil
Selinene	21 - 40% of total oil



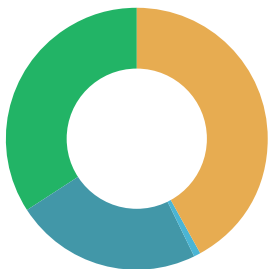
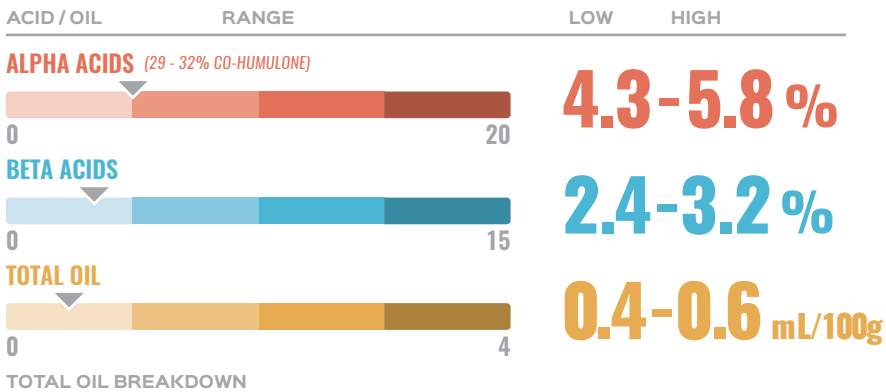
AN AROMA HOP

SUSSEX

Discovered in 2005 at Gate Court, Northiam in East Sussex, Sussex is a “chance find” variety. It is likely to have resulted from open pollination of a wild hop.

COUNTRY: UNITED KINGDOM
AROMA PROFILE: EARTHY, GRASS, MINT, CITRUS, VANILLA
BEER STYLES: ALE

BREWING VALUES:



	Myrcene	~42% of total oil
	Farnesene	< 1.0% of total oil
	Humulene	~23% of total oil
	Other	34% of total oil



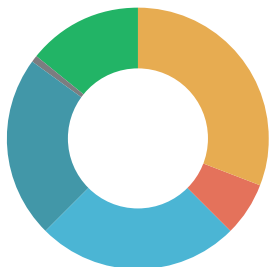
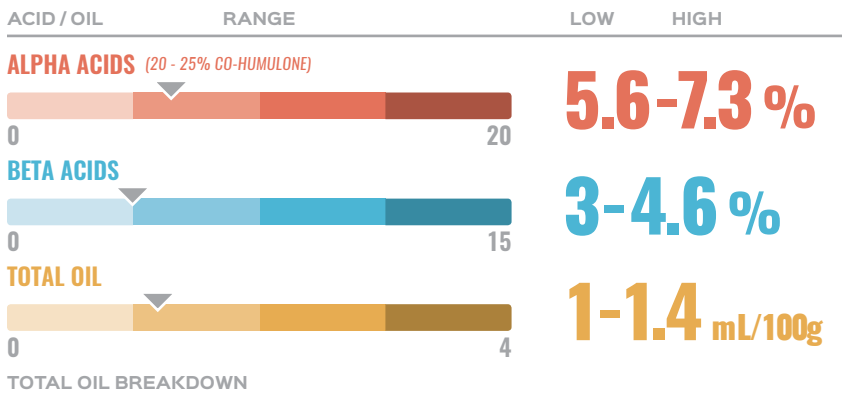
AN AROMA HOP

SYLVA™

Bred in 1997 at Tasmanian Bushy Park Breeding Garden, Sylva™ is a result of open pollination of Czech Saaz. Brewing characteristics closely resemble that of its parent, with complex yet subtle floral and herbal characteristics.

COUNTRY: AUSTRALIA
AROMA PROFILE: FLORAL, HERBAL, NOBLE
BEER STYLES: LAGER, PILSNER

BREWING VALUES:



	Myrcene	26 - 36% of total oil
	Caryophyllene	5 - 8% of total oil
	Farnesene	~25% of total oil
	Humulene	18 - 27% of total oil
	Other	3 - 25% of total oil
	Selinene	< 1.0% of total oil



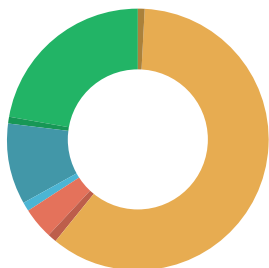
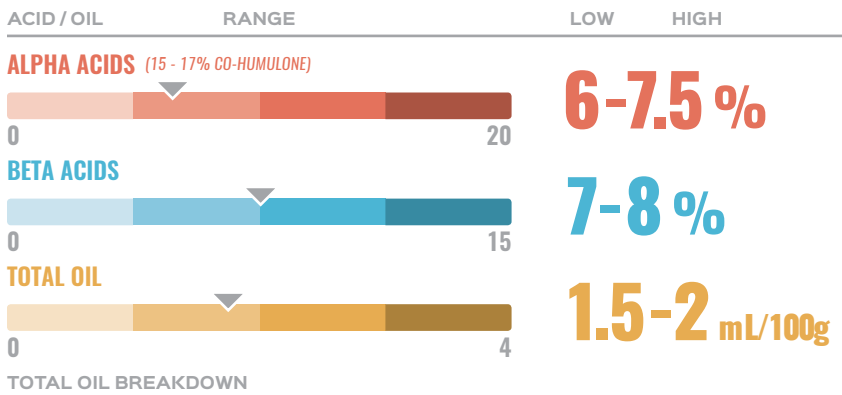
AN AROMA HOP

TAHOMA

Released by Washington State University in 2013, Tahoma is a daughter of Glacier. It retains the low co-humulone characteristic of Glacier but displays slightly higher alpha acid content. Tahoma is considered to be “Cascade-like” with a pleasant, predominantly citrus aroma profile.

COUNTRY: UNITED STATES
AROMA PROFILE: LEMON, GRAPEFRUIT, CEDAR, PINE, GREEN MELON, FLORAL, PEPPER
BEER STYLES: AMERICAN-STYLE PALE ALE, STOUT, PORTER

BREWING VALUES:



	B-Pinene	0.8 - 1.2% of total oil
	Myrcene	55 - 65% of total oil
	Linalool	0.4 - 0.8% of total oil
	Caryophyllene	3 - 5% of total oil
	Farnesene	< 1.0% of total oil
	Humulene	8 - 12% of total oil
	Geraniol	0.1 - 0.4% of total oil
	Other	15 - 32% of total oil



A DUAL PURPOSE HOP

TARGET

Bred at Wye College and released in 1972, Target is a second generation selection from Northern Brewer and a male Eastwell Golding; it is a cousin to Challenger. As a dual purpose variety, Target provides strong bittering characteristics and is unusually effective in dry hop applications compared to other English varieties.

COUNTRY: UNITED KINGDOM
AROMA PROFILE: SAGE, PEPPER, CITRUS MARMALADE, TANGERINE
BEER STYLES: ENGLISH-STYLE ALE, LAGER, BROWN ALE, STOUT

BREWING VALUES:

ACID / OIL

RANGE

LOW

HIGH

ALPHA ACIDS (35 - 40% CO-HUMULONE)



9.5-12.5 %

BETA ACIDS



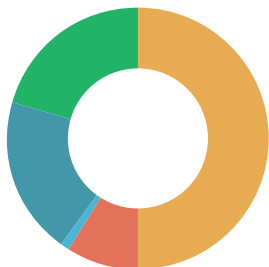
4.3-5.7 %

TOTAL OIL



1.2-1.4 mL/100g

TOTAL OIL BREAKDOWN



Myrcene	45 - 55% of total oil
Caryophyllene	8 - 10% of total oil
Farnesene	< 1.0% of total oil
Humulene	17 - 22% of total oil
Other	12 - 29% of total oil

A DUAL PURPOSE HOP

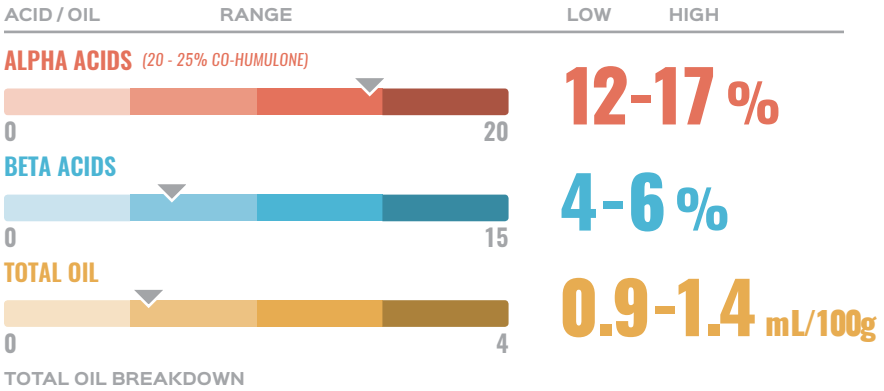
TAURUS



Bred at the Hop Research Center in Hüll and released in 1995, Taurus is a high alpha cross with noble aroma characteristics. It has good pickability of small, compact cones.

COUNTRY: GERMANY
AROMA PROFILE: BLACKCURRANT, PEPPER, ZESTY
BEER STYLES: GERMAN-STYLE ALE, LAGER

BREWING VALUES:



Myrcene	30 - 50% of total oil
Linalool	1 - 1.5% of total oil
Caryophyllene	6 - 11% of total oil
Farnesene	< 1.0% of total oil
Humulene	22 - 33% of total oil
Other	4 - 40% of total oil

AN AROMA HOP

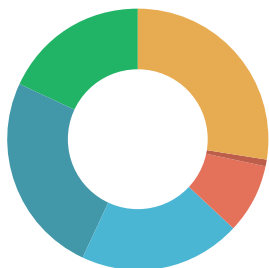
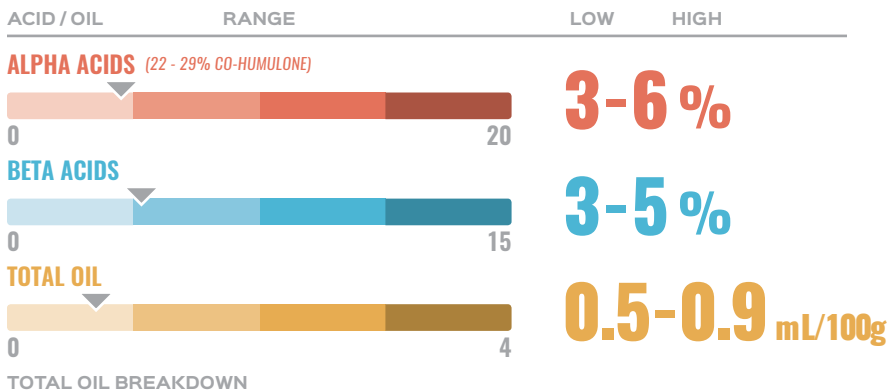
TETTNANG



A landrace variety originating from the Tettnang region on Lake Constance in Germany, Tettnang (or Tettnanger) is from the Saaz group. It displays fine, noble characteristics with a slight spiciness.

COUNTRY: GERMANY
AROMA PROFILE: SPICY, PEPPER, BLACK TEA
BEER STYLES: LAGER, WHEAT, PILSNER, GERMAN-STYLE ALE

BREWING VALUES:



Myrcene	20 - 35% of total oil
Linalool	0.4 - 0.9% of total oil
Caryophyllene	6 - 11% of total oil
Farnesene	16 - 24% of total oil
Humulene	20 - 30% of total oil
Other	< 1% - 38% of total oil



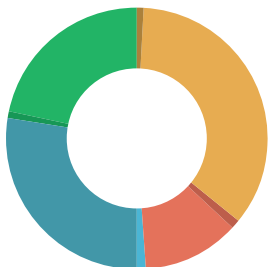
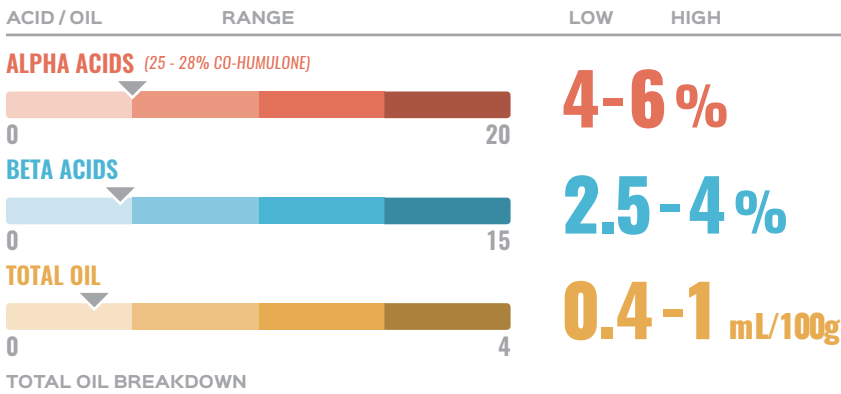
AN AROMA HOP

TETTNANG

Originating from the traditional landrace variety from Germany, Tettng is from the Saaz group. It displays fine, noble characteristics with a slight spiciness and is typically used in lager and pilsner style beers. US Tettng is grown in Washington State and Oregon.

COUNTRY: UNITED STATES
AROMA PROFILE: NOBLE
BEER STYLES: LAGER, WHEAT, PILSNER
GERMAN-STYLE ALE

BREWING VALUES:



	B-Pinene	0.3 - 0.5% of total oil
	Myrcene	30 - 40% of total oil
	Linalool	0.6 - 0.8% of total oil
	Caryophyllene	10 - 14% of total oil
	Farnesene	5 - 8% of total oil
	Humulene	25 - 30% of total oil
	Geraniol	0.2 - 0.4% of total oil
	Other	6 - 29% of total oil



A BITTERING HOP

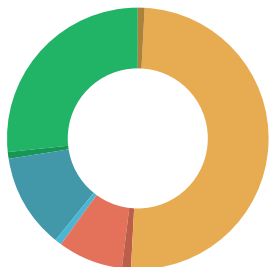
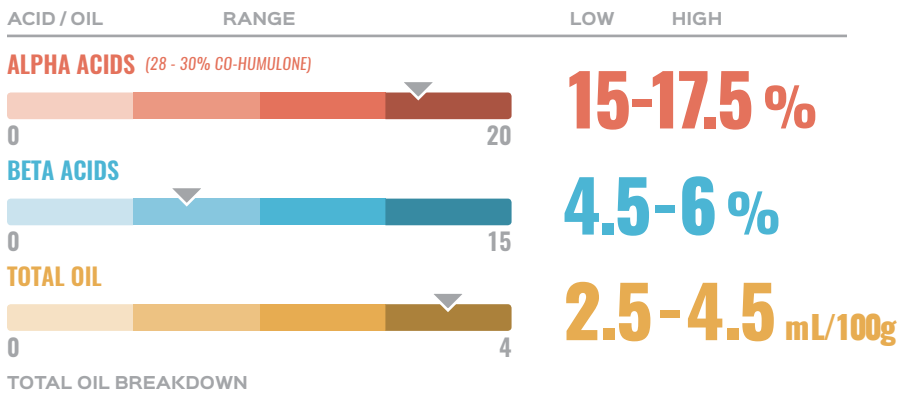
TOMAHAWK®

F10 CV

Bred by Charles Zimmermann, Tomahawk® F10 cv. was the first commercially grown "Super Alpha" variety. Tomahawk® is often referred to as CTZ, a trio of similar hops including Columbus and Zeus.

COUNTRY: UNITED STATES
AROMA PROFILE: PUNGENT, BLACK PEPPER, LICORICE, CURRY
BEER STYLES: IPA, PALE ALE, IMPERIAL ALE

BREWING VALUES:



	B-Pinene	0.6 - 1.0% of total oil
	Myrcene	45 - 55% of total oil
	Linalool	0.4 - 0.6% of total oil
	Caryophyllene	6 - 10% of total oil
	Farnesene	< 1.0% of total oil
	Humulene	9 - 14% of total oil
	Geraniol	0.2 - 0.5% of total oil
	Other	18 - 38% of total oil



A DUAL PURPOSE HOP

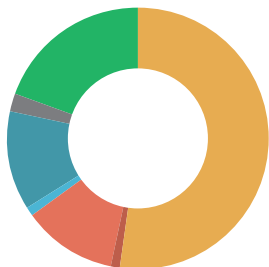
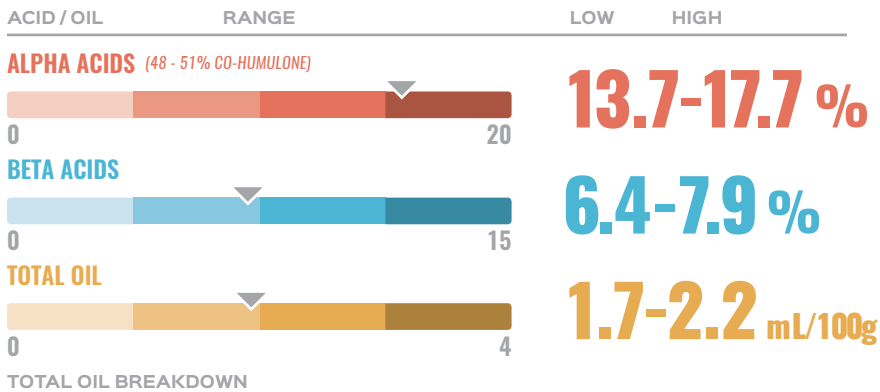
TOPAZ™

TC - 85 - 70

Bred during the 1980s, Topaz™ did not find popularity within the brewing community until 2007-2008. Its ancestry includes an existing high alpha Australian variety crossed with a Wye College male. Topaz™ is known for its single hop applications, producing resinous, grass and tropical fruit flavors.

COUNTRY: AUSTRALIA
AROMA PROFILE: RESIN, GRASS, LYCHEE
BEER STYLES: PALE ALE, IPA, AMBER

BREWING VALUES:



Myrcene	34 - 56% of total oil
Linalool	0.3 - 0.6% of total oil
Caryophyllene	7 - 13% of total oil
Farnesene	< 1.0% of total oil
Humulene	8 - 13% of total oil
Other	13 - 49% of total oil
Selinene	1 - 3% of total oil

AN AROMA HOP

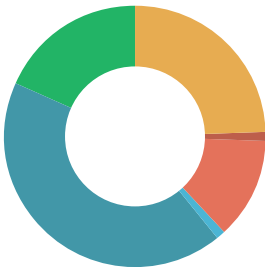
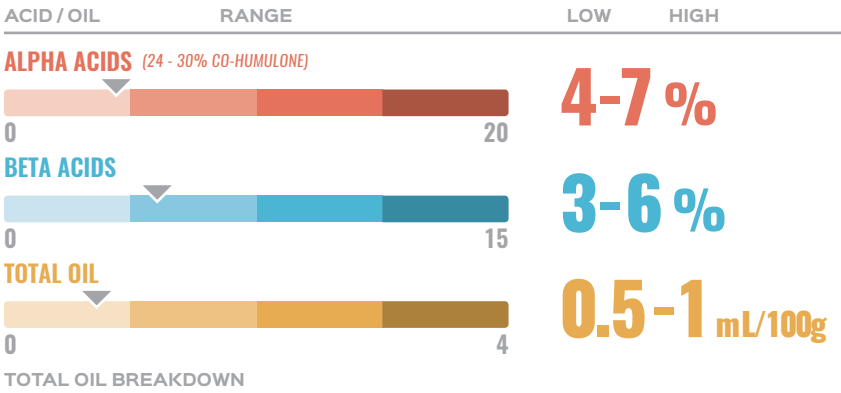
TRADITION



Bred at the Hop Research Institute in Hüll and registered in 1993, Tradition is a daughter of Hallertau Gold. It is often compared to Mittelfrüh, displaying fine, noble characteristics with a fruity twist.

COUNTRY: GERMANY
AROMA PROFILE: GRASS, TEA, LAVENDER, ORANGE
BEER STYLES: GERMAN-STYLE LAGER, WHEAT, PILSNER

BREWING VALUES:



Myrcene	17 - 32% of total oil
Linalool	0.7 - 1.3% of total oil
Caryophyllene	10 - 15% of total oil
Farnesene	< 1.0% of total oil
Humulene	35 - 50% of total oil
Other	1 - 36% of total oil



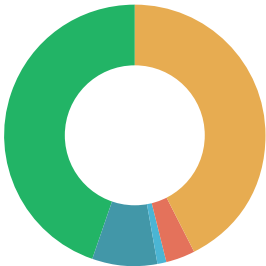
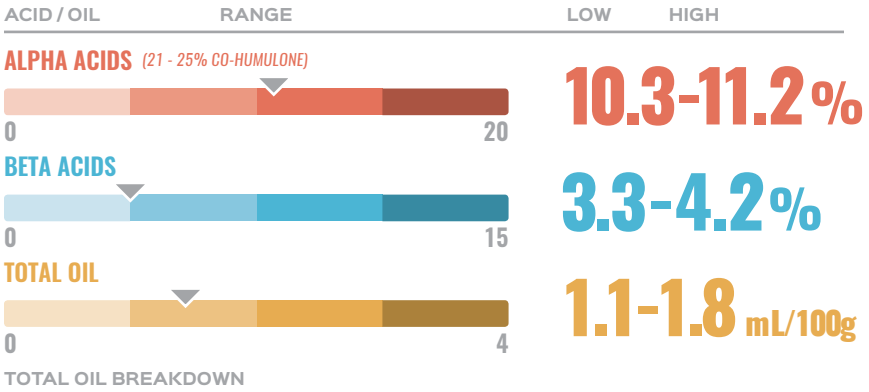
AN AROMA HOP

TRIPLEPEARL

Released by USDA-ARS in 2013, TriplePearl is an open pollinated cross between a tetraploid Perle female and an unknown diploid male. Its lineage includes Northern Brewer and Hallertau. TriplePearl is similar to Perle but features more pronounced aroma characteristics.

COUNTRY: UNITED STATES
AROMA PROFILE: MELON, ORANGE, RESIN, SPICE, PEPPER
BEER STYLES: PALE ALE

BREWING VALUES:



	Myrcene	39 - 55% of total oil
	Caryophyllene	3 - 5% of total oil
	Farnesene	< 1.0% of total oil
	Humulene	7 - 11% of total oil
	Other	28 - 50% of total oil

AN AROMA HOP

TRISKEL



Developed in 2006 as a cross between Strisselspalt and Yeoman, Triskel contains many of the same characteristics as Strisselspalt but displays a more pronounced flavor profile.

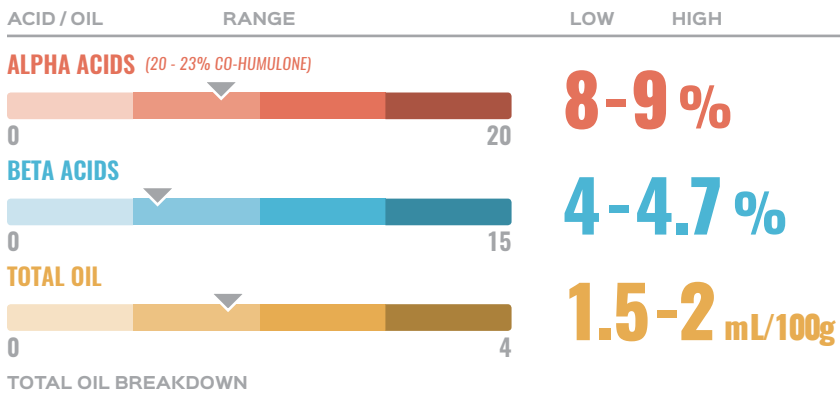
COUNTRY:

FRANCE

AROMA PROFILE: **FLORAL, HERBAL, CITRUS, SPICY**

BEER STYLES: **SAISON, LAGER, WHEAT, PILSNER, BELGIAN-STYLE ALE, PALE ALE,**

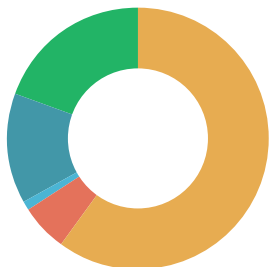
BREWING VALUES:








8-9%

4-4.7%

1.5-2 mL/100g



	Myrcene	60% of total oil
	Caryophyllene	6.1% of total oil
	Farnesene	< 1.0% of total oil
	Humulene	13.5% of total oil
	Other	79 - 26% of total oil



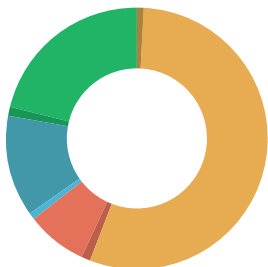
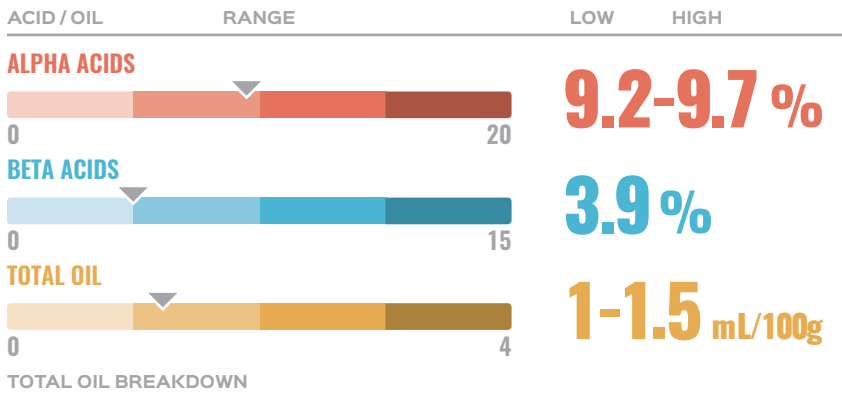
AN AROMA HOP









ULTRA

Bred by the hops research program in Corvallis, Oregon in 1983 and released in 1995 by the USDA, Ultra is a triploid seedling of Hallertau Mittelfrüh and half sister to Mt. Hood, Liberty and Crystal. Ultra is related to traditional German varieties and can be utilized in similar applications.

COUNTRY: UNITED STATES
AROMA PROFILE: MILD, FLORAL BOUQUET
BEER STYLES: LAGER, PILSNER, WHEAT

BREWING VALUES:



	B-Pinene	0.6 - 1.0% of total oil
	Myrcene	50 - 60% of total oil
	Linalool	1.0 - 1.5% of total oil
	Caryophyllene	6 - 9% of total oil
	Farnesene	< 1.0% of total oil
	Humulene	10 - 15% of total oil
	Geraniol	0.1 - 0.5% of total oil
	Other	12 - 31% of total oil



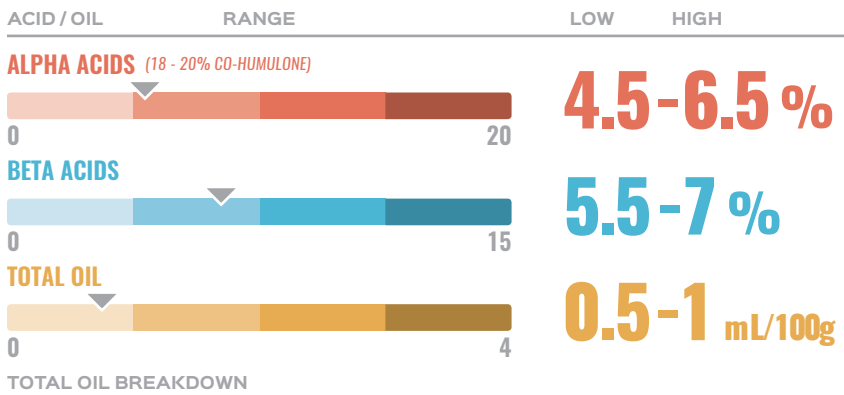
AN AROMA HOP

VANGUARD

Bred in 1982 by the USDA and released in 1997, Vanguard is an aroma variety with similar characteristics to Hallertau Mittelfrüh. Vanguard is typically utilized in traditional German-style beers as a noble type variety.

COUNTRY: UNITED STATES
AROMA PROFILE: WOOD
BEER STYLES: LAGER, BELGIAN-STYLE ALE, WHEAT, PILSNER

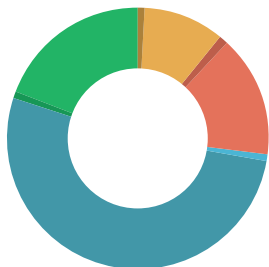
BREWING VALUES:



4.5-6.5 %

5.5-7 %

0.5-1 mL/100g



	B-Pinene	0.1 - 0.6% of total oil
	Myrcene	5 - 15% of total oil
	Linalool	0.2 - 0.4% of total oil
	Caryophyllene	13 - 17% of total oil
	Farnesene	< 1.0% of total oil
	Humulene	49 - 55% of total oil
	Geraniol	0.1 - 0.2% of total oil
	Other	11 - 32% of total oil



A DUAL PURPOSE HOP

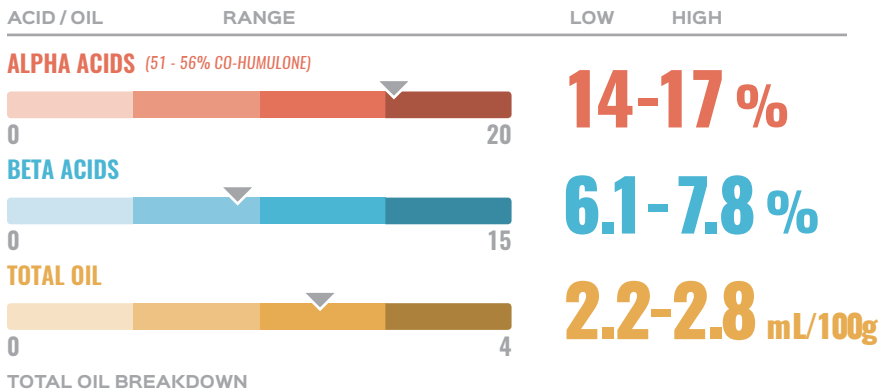
VIC SECRET™

00 - 207 - 013

Developed in 2000 and reaching commercial production in 2013, Vic Secret™ is one of the newest hop varieties from Australia. It is a sister to Topaz™ containing high alpha content and displaying pronounced tropical fruit flavors in whirlpool and dry hop additions.

COUNTRY: AUSTRALIA
AROMA PROFILE: PINE, EARTH, PINEAPPLE, PASSIONFRUIT
BEER STYLES: PALE ALE, IPA, STOUT, PORTER

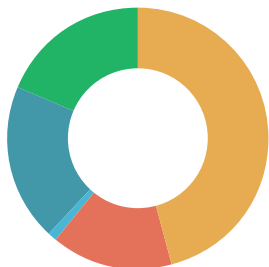
BREWING VALUES:



14-17 %

6.1-7.8 %

2.2-2.8 mL/100g



Myrcene	38 - 41% of total oil
Caryophyllene	11 - 15% of total oil
Farnesene	< 1.0% of total oil
Humulene	12 - 21% of total oil
Other	22 - 38% of total oil



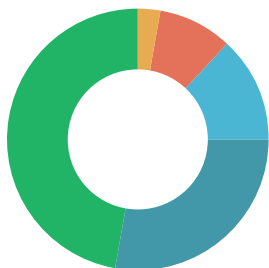
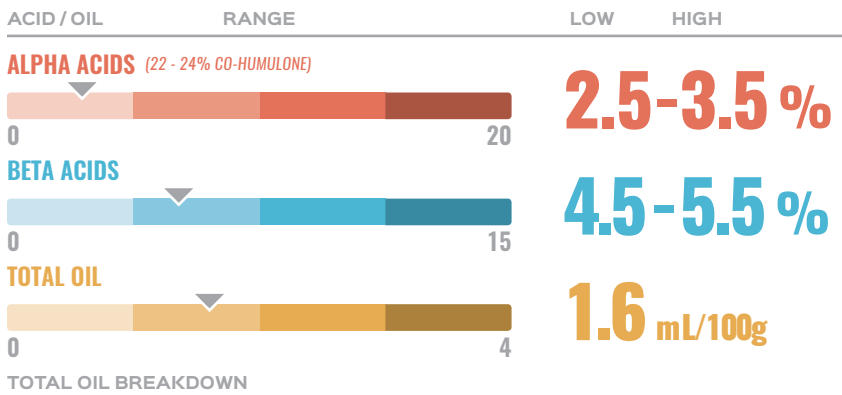
AN AROMA HOP

WAI-ITI

Developed by the New Zealand Institute for Plant and Food Research hop breeding program and released in 2011, Wai-iti is a granddaughter of Liberty and is derived from 1/3 Hallertau Mittelfrüh. Fresh peaches and stone fruit dominate the aroma in single hopped beers and when combining with other varieties in late additions. Wai-iti is best known for its fruity, aroma-driven results.

COUNTRY: **NEW ZEALAND**
AROMA PROFILE: **PEACH, APRICOT, SPICE, LIME, TROPICAL FRUIT**
BEER STYLES: **PALE ALE, PILSNER, IPA, WHEAT**

BREWING VALUES:



	Myrcene	3% of total oil
	Caryophyllene	9% of total oil
	Farnesene	13% of total oil
	Humulene	28% of total oil
	Other	47% of total oil



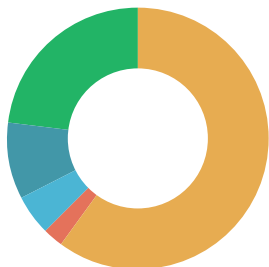
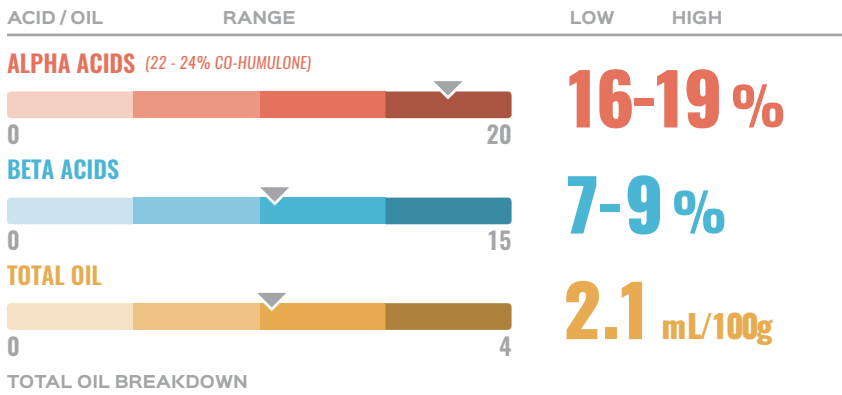
A BITTERING HOP






WAIMEA

Developed by the New Zealand Institute for Plant and Food Research hop breeding program and released in 2012, Waimea's lineage includes Californian Late Cluster, Saaz and Fuggle. Waimea is a big hop for big beers and can be used across an array of styles in a variety of brew house and dry hopping applications.

COUNTRY: **NEW ZEALAND**
AROMA PROFILE: **CITRUS, PINE, HERBAL**
BEER STYLES: **IPA, LAGER**

BREWING VALUES:



	Myrcene	60% of total oil
	Caryophyllene	2.6% of total oil
	Farnesene	5% of total oil
	Humulene	9.5% of total oil
	Other	23 - 23% of total oil



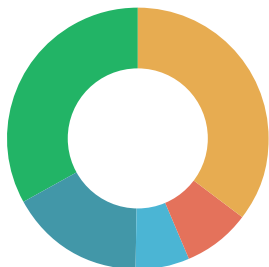
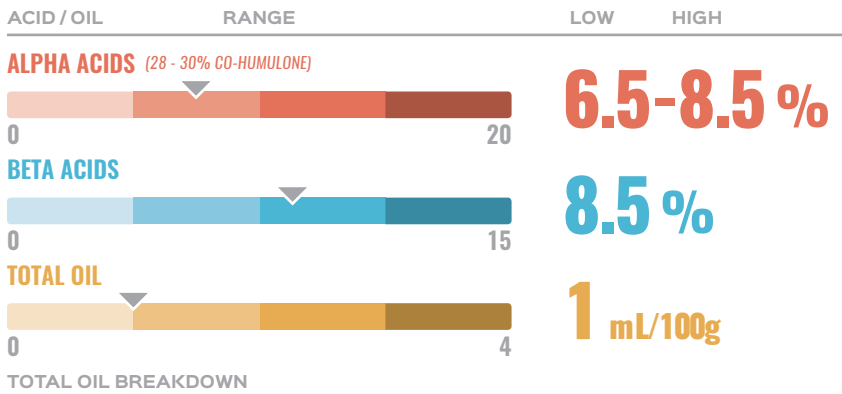
AN AROMA HOP

WAKATU

Developed by the New Zealand Institute for Plant and Food Research hop breeding program and released in 1988, as Hallertau Aroma, Wakatu was renamed in 2011. It is a triploid variety with two thirds Hallertau Mittelfrüh parentage. Wakatu is a well rounded variety with strong, fresh citrus characteristics and some bittering capabilities.

COUNTRY: **NEW ZEALAND**
AROMA PROFILE: **LIME ZEST, FLORAL**
BEER STYLES: **LAGER, PALE ALE, PILSNER, BOCK**

BREWING VALUES:



	Myrcene	35.5% of total oil
	Caryophyllene	8.2% of total oil
	Farnesene	6.7% of total oil
	Humulene	16.8% of total oil
	Other	32.8% of total oil



A BITTERING HOP

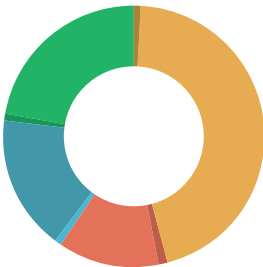
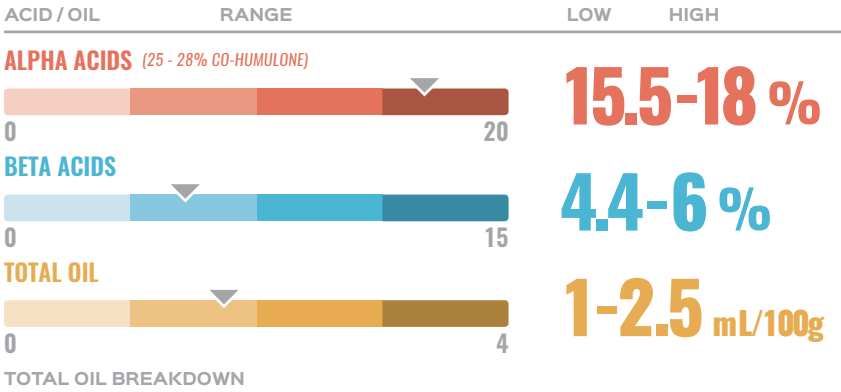
WARRIOR®

YCR 5 CV

Developed by Select Botanicals Group, Warrior® was selected for its high alpha content, low co-humulone, good storage stability and tolerance to powdery mildew. It is primarily used for its mild, clean bittering properties.

COUNTRY: UNITED STATES
AROMA PROFILE: MILD, RESINOUS
BEER STYLES: IPA, PALE ALE, RYE ALE

BREWING VALUES:



	B-Pinene	0.5 - 0.7% of total oil
	Myrcene	40 - 50% of total oil
	Linalool	0.4 - 0.7% of total oil
	Caryophyllene	11 - 14% of total oil
	Farnesene	< 1.0% of total oil
	Humulene	15 - 18% of total oil
	Geraniol	0.4 - 0.8% of total oil
	Other	15 - 32% of total oil



AN AROMA HOP

WHITBREAD GOLDING

Developed through grower selection circa 1911, Whitbread Golding (WGV) is not a true Golding. It displays many similar characteristics but has more robust and slightly sweet, hoppy flavor.

COUNTRY: UNITED KINGDOM
AROMA PROFILE: FRESH EARTH, FLORAL, SWEET FRUIT
BEER STYLES: ENGLISH-STYLE BITTER, PALE ALE, BIÈRE DE GARDE, SAISON, WHEAT

BREWING VALUES:

ACID / OIL

RANGE

LOW

HIGH

ALPHA ACIDS (32 - 43% CO-HUMULONE)



5.4-7.7 %

BETA ACIDS



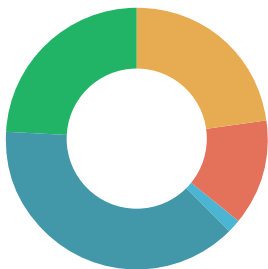
2-3.3 %

TOTAL OIL



0.8-1.2 mL/100g

TOTAL OIL BREAKDOWN



Myrcene	19 - 27% of total oil
Caryophyllene	11 - 15% of total oil
Farnesene	1 - 2% of total oil
Humulene	35 - 42% of total oil
Other	14 - 34% of total oil



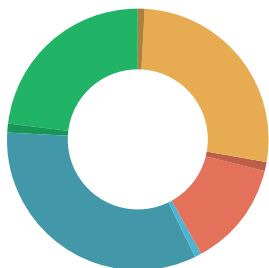
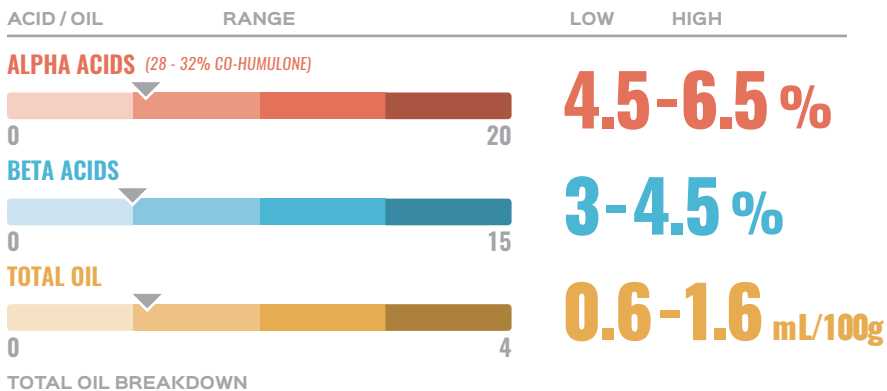
AN AROMA HOP









WILLAMETTE

Released in 1976 from the USDA breeding program, Willamette is a triploid seedling of English Fuggle. For years, it was the most widely grown aroma variety in the US. It is named after Oregon's Willamette River which runs through the heart of the state's hop growing region.

COUNTRY: UNITED STATES
AROMA PROFILE: FLORAL, INCENSE, ELDERBERRY
BEER STYLES: ENGLISH-STYLE ALE, BROWN ALE, LAGER, PALE ALE, STOUT, PORTER

BREWING VALUES:



	B-Pinene	0.3 - 0.5% of total oil
	Myrcene	22 - 32% of total oil
	Linalool	0.4 - 0.7% of total oil
	Caryophyllene	12 - 14% of total oil
	Farnesene	7 - 10% of total oil
	Humulene	31 - 35% of total oil
	Geraniol	0.1 - 0.3% of total oil
	Other	8 - 27% of total oil



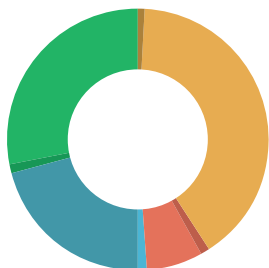
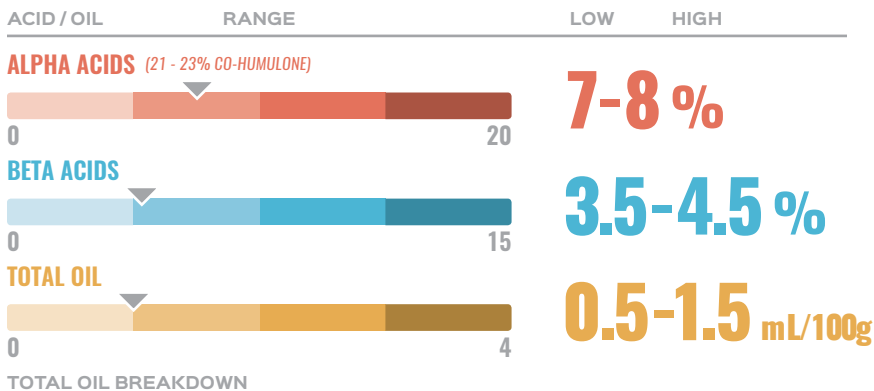
A DUAL PURPOSE HOP

YAKIMA GOLD

Released by Washington State University in 2013, Yakima Gold is a cross between Early Cluster and a native Slovenian male. It is an excellent general purpose variety with smooth bitterness and pleasant aroma characteristics.

COUNTRY: UNITED STATES
AROMA PROFILE: GRAPEFRUIT, LEMON ZEST
BEER STYLES: ENGLISH-STYLE ALE,
GERMAN-STYLE ALE

BREWING VALUES:



	B-Pinene	0.2 - 0.6% of total oil
	Myrcene	35 - 45% of total oil
	Linalool	0.1 - 0.5% of total oil
	Caryophyllene	5 - 9% of total oil
	Farnesene	8 - 12% of total oil
	Humulene	18 - 24% of total oil
	Geraniol	0.0 - 0.2% of total oil
	Other	9 - 34% of total oil



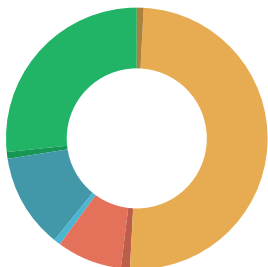
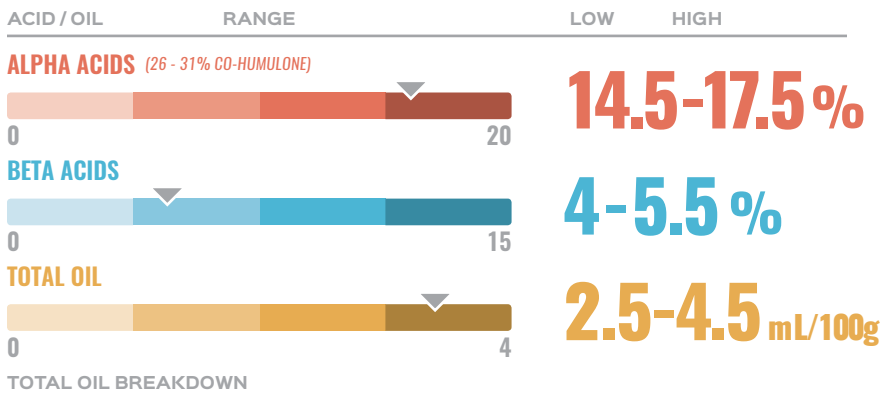
A BITTERING HOP

ZEUS

Although genetically different, Zeus is often referred to as part of CTZ along with Columbus and Tomahawk®, a trio of similar hops.

COUNTRY: UNITED STATES
AROMA PROFILE: PUNGENT, BLACK PEPPER, LICORICE, CURRY
BEER STYLES: IPA, PALE ALE, IMPERIAL ALE, STOUT, BARLEY WINE, LAGER

BREWING VALUES:



	B-Pinene	0.6 - 1.0% of total oil
	Myrcene	45 - 55% of total oil
	Linalool	0.4 - 0.6% of total oil
	Caryophyllene	6 - 10% of total oil
	Farnesene	< 1.0% of total oil
	Humulene	9 - 14% of total oil
	Geraniol	0.2 - 0.5% of total oil
	Other	18 - 38% of total oil



A PELLET BLEND

ZYTHOS®

Named in honor of the Greek word for beer, Zythos® embodies the powerful tradition and unique aroma characteristics required in premium craft brews. This pellet blend is comprised of publicly available varieties, delivering distinct pineapple and citrus tones, with subtle pine characteristics.

COUNTRY: UNITED STATES
AROMA PROFILE: PINEAPPLE, CITRUS, PINE
BEER STYLES: AMERICAN-STYLE ALE, IPA, PALE ALE

BREWING VALUES:

