

Variety Manual

QUALITY
VARIETY
TRADITION

USA HOPS

HOP GROWERS OF AMERICA





INTRODUCTION From the sun-soaked volcanic soil of Washington's Yakima Valley and Idaho's Treasure Valley, to the lush landscape of Oregon's Willamette Valley, U.S. hop growers produce a wide range of aroma, bittering, and super-alpha hops. The unique combination of quality, consistency, and varietal diversity make the American hop industry unmatched, and we are proud that our hops can be found in beer styles throughout the world. This manual contains hop varieties that are grown in Washington, Oregon, and Idaho—including some American-grown European varieties. The varieties listed here account for approximately 99% of the commercially available acreage in the U.S. The Hop Growers of America encourage you to sample the diverse selection of premium hops grown in the United States. Please refer to the buyers guide on the last page to see a list of companies that sell American hops.

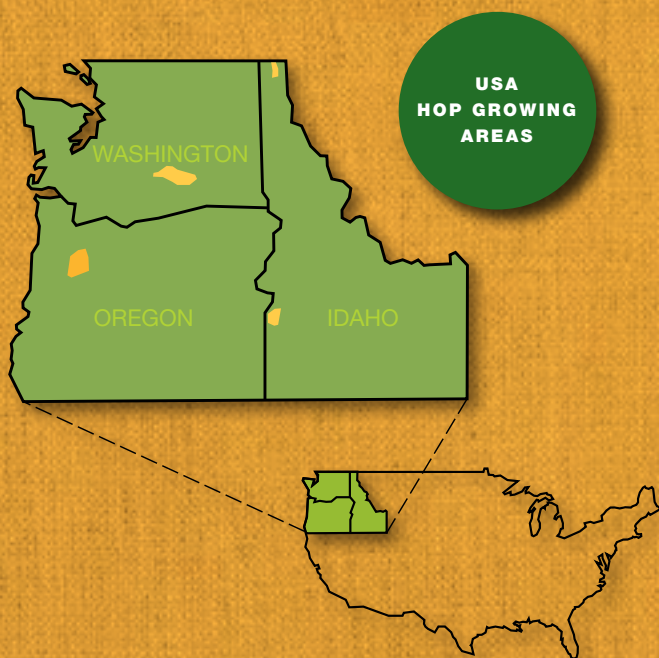


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Data for Apollo, Bravo, Calypso, Delta, and Super Galena were provided by S. S. Steiner, Inc. Data for Amarillo® were provided by Virgil Gamache Farms, Inc. Data for El Dorado® were provided by CLS Farms, LLC. Data for Ahtanum™, Citra®, Mosaic™, Palisade®, Simcoe®, and Warrior® were provided by Hop Breeding Company, LLC. Data for Summit™ were provided by the American Dwarf Hop Association. Data for US Brewer's Gold, Crystal, US Fuggle, US Hallertau, US Magnum, US Northern Brewer, US Perle, US Saaz, Santiam, and US Tettnang were obtained from the Hopunion, LLC Directory of Hop Data. The "Barth-Haas Hops Companion" (Copyright © 2009 by John I. Haas, Inc.) was used to obtain data for Cascade, Centennial, Chelan, Chinook, Cluster, CTZ, Galena, Glacier, US Golding, Horizon, Liberty, Millennium, Mt. Hood, Newport, Nugget, Sterling, Ultra, Vanguard, and Willamette. Data for Cashmere, Comet, Mt. Rainier, Sorachi Ace, Tahoma, and Yakima Gold were provided by Washington State University. The Hop Growers of America would like to thank these organizations for their support.

AMERICAN-GROWN HOP VARIETIES

Arranged By Alpha

Ultra	2.0 – 3.5%
Saaz (US)	3.0 – 4.5%
Liberty	3.0 – 5.0%
Tettnang (US)	4.0 – 5.0%
Crystal	3.5 – 5.5%
Hallertau (US)	3.5 – 5.5%
Fuggles (US)	4.0 – 5.5%
Glacier	5.5 – 5.5%
Golding (US)	4.0 – 6.0%
Willamette	4.0 – 6.0%
Vanguard	5.5 – 6.0%
Ahtanum™	5.7 – 6.3%
Mt. Hood	4.0 – 7.0%
Cascade	4.5 – 7.0%
Santiam	5.0 – 7.0%
Delta	5.5 – 7.0%
Tahoma	7.2 – 8.2%
Cluster	5.5 – 8.5%
Sterling	6.0 – 9.0%
Cashmere	7.7 – 9.1%
Palisade®	5.5 – 9.5%
Perle (US)	7.0 – 9.5%
Brewer's Gold (US)	8.0 – 10.0%
Northern Brewer (US)	8.0 – 10.0%
Yakima Gold	8.8 – 10.5%

Acids (Average Range)

Mt. Rainier	8.0 – 10.8%
Amarillo®	8.0 – 11.0%
Comet	9.0 – 11.0%
Centennial	9.5 – 11.5%
Citra®	11.0 – 13.0%
Horizon	11.0 – 13.0%
Sorachi Ace	12.0 – 13.0%
Mosaic™	11.5 – 13.5%
Galena	11.5 – 13.5%
Nugget	11.5 – 14.0%
Calypso	12.0 – 14.0%
Chinook	12.0 – 14.0%
Magnum (US)	12.0 – 14.0%
Simcoe®	12.0 – 14.0%
Chelan	12.0 – 14.5%
Super Galena	13.0 – 16.0%
El Dorado®	14.0 – 16.0%
Columbus/Tomahawk®/Zeus	14.5 – 16.5%
Millennium	14.5 – 16.5%
Newport	13.5 – 17.0%
Bravo	14.0 – 17.0%
Warrior®	15.0 – 18.0%
Summit™	16.0 – 18.0%
Apollo	15.0 – 19.0%

AMERICAN-GROWN HOP VARIETIES

Arranged By Total

*ml/100g

Cluster	0.4 – 0.8
Tettnang (US)	0.4 – 0.8
Perle (US)	0.7 – 0.9
Saaz (US)	0.5 – 1.0
Ultra	0.5 – 1.0
Hallertau (US)	0.6 – 1.0
Golding (US)	0.7 – 1.0
Delta	0.5 – 1.1
Liberty	0.6 – 1.2
Fuggle (US)	0.7 – 1.2
Ahtanum™	0.8 – 1.2
Vanguard	0.9 – 1.2
Galena	0.9 – 1.3
Cascade	0.7 – 1.4
Comet	1.0 – 1.5
Crystal	1.0 – 1.5
Willamette	1.0 – 1.5
Mosaic™	1.0 – 1.5
Cashmere	1.2 – 1.4
Santiam	1.3 – 1.5
Glacier	0.7 – 1.6
Palisade®	1.4 – 1.6
Mt. Hood	1.2 – 1.7
Warrior®	1.3 – 1.7
Sterling	1.3 – 1.9

Oils* (Average Range)

Amarillo®	1.5 – 1.9
Chelan	1.5 – 1.9
Tahoma	1.0 – 2.0
Horizon	1.5 – 2.0
Northern Brewer (US)	1.5 – 2.0
Millennium	1.8 – 2.2
Nugget	1.8 – 2.2
Centennial	1.5 – 2.3
Magnum (US)	1.9 – 2.3
Yakima Gold	1.9 – 2.3
Bravo	1.6 – 2.4
Brewer's Gold (US)	2.0 – 2.4
Apollo	1.5 – 2.5
Summit™	1.5 – 2.5
Super Galena	1.5 – 2.5
Calypso	1.6 – 2.5
Simcoe®	2.0 – 2.5
Chinook	1.7 – 2.7
Mt. Rainier	1.8 – 2.7
Citra®	2.2 – 2.8
El Dorado®	2.5 – 2.8
Columbus/Tomahawk®/Zeus	2.0 – 3.0
Sorachi Ace	2.8 – 3.2
Newport	1.6 – 3.4

AHTANUM™

Ahtanum (YCR 1 cv.) is an aroma-type cultivar bred by Select Botanicals Group. It is used for its aromatic properties and moderate bittering. It has unique aromas that include citrus (grapefruit), earthy, and floral. The variety is named after the location where Charles Carpenter established the first hop farm in the Yakima Valley in 1869.



VGXP01 AMARILLO® BRAND

The VGXP01 variety was a chance discovery by Virgil Gamache Farms Inc. of Toppenish WA. Joining an exclusive pantheon of land-race varieties, the VGXP01 has been a proud contributor to the success of the U.S. Craft Beer movement. Sold under the brand name Amarillo and managed exclusively by Virgil Gamache Farms, it continues to see commercial success in numerous beer styles around the world. VGXP01 pairs well with a multitude of yeast strains and works harmoniously with other hop flavor profiles in both kettle and dry hopping processes.



APOLLO

Apollo (Hopsteiner 0151) is a super high alpha variety that was developed by the Hopsteiner Breeding Program and released in 2006. The very high alpha, good storage stability and low cohumulone ratio make it an excellent choice for bittering. Added late into the boil it provides a strong grapefruit and hoppy note.



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BRAVO

Bravo (Hopsteiner 0146) is a second generation super high alpha variety that was developed by the Hopsteiner Breeding Program and released in 2006. Bravo is an excellent bittering hop that provides pleasant fruity and floral aroma characteristics.



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BREWER'S GOLD (US)

Brewer's Gold is an English variety that is primarily used as a bittering hop. It is a descendent of Bullion and has many of the same varietal attributes. American-grown Brewer's Gold has a higher percentage of alpha acids than its counterpart in England.

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CASCADE

Cascade is an aroma hop that was developed by the U.S.D.A. breeding program in Oregon and released in 1972. It has a medium strength aroma that provides a unique floral/spicy character with well balanced bittering potential. It is the most popular hop with the U.S. craft brewing industry.



CASHMERE

Cashmere was released by Washington State University in 2013. A daughter of Cascade, it includes Northern Brewer germplasm through the male parent. The alpha acid content of Cashmere is higher than Cascade. Cashmere contains no farnescene and twice as much humulene as Cascade. Cashmere has a mild herbal aroma and smooth bitterness.

CALYPSO

Calypso (Hopsteiner 03129) is a diploid aroma-type hop, originated from a cross between Hopsteiner breeding female 98005 and a Hopsteiner male derived from Nugget and USDA 19058m. It has a pleasant fruity aroma with hints of pear and apple.



CENTENNIAL

Centennial is an aroma variety that was released by Washington State University in 1990. It was derived from three-quarters Brewer’s Gold with minor contributions from Fuggle, East Kent Golding and others. It is among the most popular varieties for U.S. craft brewers and is sometimes referred to as a super Cascade.

CHELAN

Chelan is a high alpha variety with a very high percentage of beta acids. The variety was developed through the John I. Haas, Inc., breeding program and released in 1994. It is a daughter of Galena and therefore has analytical data similar to Galena.



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CHINOOK

Chinook was developed by the U.S.D.A. breeding program in Washington State and released in 1985 as a high alpha variety. It has a highly acceptable beer aroma profile with smooth bitterness and full flavor.



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CITRA®

Citra is a special aroma hop variety developed by the Hop Breeding Company. It was released in 2008. Citra brand hops have fairly high alpha acids and total oil contents with a low percentage of cohumulone content. Citra brand hops impart interesting citrus and tropical fruit characters to beer.



CLUSTER

Cluster is the oldest hop variety grown in the U.S. Until the late 1970's, Cluster was one of only a few varieties growing in the U.S. and accounted for most of the country's hop acreage. It is an excellent general purpose hop with well-balanced bittering potential and aroma properties. The storage stability of its alpha acids is among the best in the world.



COLUMBUS/TOMAHAWK®/ZEUS (CTZ)

These three super high alpha varieties are often grouped together and referred to as CTZ. Each of these varieties has alpha acid content of between 14.5- 16.5% and share the same female parent as Nugget. Originally bred for their high alpha value, they have also become popular for their oil profile.



COMET

Comet was released by the U.S.D.A. in 1974 to meet the need for a higher alpha-acid producing hop well adapted to the Yakima Valley. Comet is from a cross between the English hop Sunshine and a native North American male. This bittering hop has a unique native American aroma that imparts grapefruit-citrus flavor notes.

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CRYSTAL

Crystal is a triploid variety that was bred by U.S.D.A. from Hallertau mf, Cascade, Northern Brewer, and Early Green. It is perceived as the most pungent of the triploid Hallertau family of hops, and is increasingly popular among U.S. craft brewers. It is a versatile variety that is used in Pilsners and Lagers, as well as in ESB's and American and Belgian-style Ales. Crystal is primarily grown in Oregon.

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DELTA

Delta (Hopsteiner 04188) is a new aroma variety that was developed by the Hopsteiner Breeding Program and released in 2009. It is a cross between Fuggle and a male variety derived from Cascade. Delta has a mild and pleasant aroma that is slightly spicy with a hint of citrus.



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EL DORADO®

El Dorado® is a special dual purpose variety with exceptional aroma qualities and high alpha acids. It was developed by CLS Farms, LLC in 2008 and released in 2010. El Dorado consistently elicits responses of fruity notes, specifically tropical fruit flavors. Other fruit notes offered have been pear, watermelon and stone fruit. El Dorado is marketed in the U.S. by BSG Craftbrewing and internationally by Charles Faram Co. Ltd.



FUGGLE (US)

This classic English aroma variety has long been grown in both Oregon and Washington. It has a typical English aroma and contributes a balanced bitterness. Fuggle is very suitable for English and American-style Ales.



GALENA

Galena is a high alpha variety that was developed in the Idaho state breeding program in 1978. It has balanced bittering properties combined with an agreeable aroma profile. Galena's storage stability is excellent. It is often used in both English and American-style Ales.



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GLACIER

Glacier is a dual-purpose hop with well balanced bittering properties and a pleasant aroma profile. It was released in 2000 from the Washington State University breeding program. It is commonly used in beer styles such as Pale Ale, ESB, Bitter, English-Style Pale Ale, Porter, and Stout.



GOLDING (US)

Golding hops consist of a group of traditional English aroma varieties which have been cultivated since 1790. Several selections now exist including Cobbs, Early Bird, East Well, Bramling, Canterbury and Mathon, some of which are now being grown in the U. S. All Goldings are recognized as having a most typical English aroma.



HALLERTAU (US)

This traditional German land-race variety has limited acreage in the U.S. Its noble aroma character is considered mild, pleasant, and slightly flowery.

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HORIZON

Horizon is a half-sister to Nugget. It is generally considered a dual purpose hop with medium alpha and good aroma. Horizon's low cohumulone results in a clean tasting beer.

LIBERTY

Liberty is a triploid Hallertau variety that was bred by U.S.D.A. Of the four triploid Hallertau mf varieties released by U.S.D.A., Liberty most closely resembles the Hallertau mf cultivar. It is typically used in Lager, Pilsner, Bock, US Wheat, and Kölsch beers.

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MAGNUM (US)

Magnum is a high alpha variety that was developed at the Hop Research Center in Huell, Germany. It is widely grown in the Hallertau region of Germany, and is also grown in the U.S. Magnum is a good bittering hop for Ales and Lagers.

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MILLENNIUM

Millennium is a high alpha variety bred in the John I. Haas, Inc. breeding program and released in 2000. Its brewing profile is comparable to Nugget and Columbus, being used primarily as a bittering hop with strong alpha potential.



MOSAIC™

Mosaic™ brand HBC 369 cv is an aroma variety that was released in 2012 by Hop Breeding Company, LLC. Mosaic™ offers a unique and complex blend of floral, tropical, fruity, and earthy characteristics that translate very favorably into several styles of beer. Mosaic™ is the daughter of Simcoe® brand YCR 14 hop variety and a Nugget derived male.



MT. HOOD

Named after the famous Oregon volcano, Mt. Hood is an aroma variety that was bred from the German Hallertauer variety and released in 1989 from the U.S.D.A. breeding program in Oregon. It has clear similarities to German Hallertauer and Hersbrucker, and is typically used in Lagers, Pilsners, Bocks, Wheat, Alt, and Helles beers.



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MT. RAINIER

Mt. Rainier was released by the U.S.D.A. in 2008 as a dual-purpose hop. Mt. Rainier is a daughter of the German cultivar Magnum and has higher alpha acid content than many other aroma-type hops. Mt. Rainier has smooth bitterness due to its lower cohumulone content and imparts licorice and floral flavor notes.

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NEWPORT

A high-alpha hop developed by the U.S.D.A. breeding program at Oregon State University using Hallertau Magnum as its mother. Newport has excellent yields and is resistant to both powdery and downy mildews.

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NORTHERN BREWER (US)

Northern Brewer was bred in England in 1934 from a female American hop and an English male. It is a dual purpose hop with moderate alpha and a good aroma profile. Northern Brewer's acreage has declined in England, but is still widely grown in Germany. It is also grown in the U.S.

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NUGGET

Nugget is a high alpha variety released in 1983 from the U.S.D.A. breeding program in Oregon. It is characterized by a mild herbal aroma, a low proportion of cohumulone, and good storage stability. It is used by brewers both for bittering and for its aroma profile. Nugget is one of the most widely grown varieties in Oregon and also has significant acreage in Washington State.



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PALISADE®

Palisade® brand YCR 4 cv is an aroma variety bred by Select Botanicals Group. It contributes mild stone fruit, spicy and floral aromatic and flavor notes to beer.



PERLE (US)

Perle was bred from Northern Brewer at the Hop Research Center in Huell, Germany. It is well established in Germany and is also grown in both Oregon and Washington. Perle is a dual purpose variety with moderate alpha levels and a nice aroma profile. It is popular with growers due to its high yields and resistance to downy mildew and wilt.



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SAAZ (US)

This traditional variety from the Czech Republic is grown on a limited basis in the U.S. It has a classic noble aroma that is famously used in Pilsners.

SANTIAM

Released in 1997, Santiam was bred from Tett nang, Hallertau, and a cultivar derived from Cascade. Its resin, oil, and flavor profile are similar to Tett nang, but it has the lower CoH of Hallertau.

SIMCOE®

Developed by Select Botanicals Group, Simcoe® is an aroma hop variety known for its versatility and unique characteristics. Simcoe® brand hops boast several different aromas including passion fruit, pine, earthy, and citrus, and also have strong bittering qualities with an alpha acid level of 12%-14%. It is used extensively in the craft and home brewing industry.



SORACHI ACE

Sorachi Ace was developed by the Sapporo Brewery Company in Japan by combining Brewer's Gold and Saaz ancestry. Although released by 1994, its popularity has only recently increased. The hops have a high alpha acid content so their use as a bittering hop is natural. The mild aroma with a touch of lemon citrus flavor can enhance dry hopping procedures.

STERLING

Sterling is an aroma variety that was bred from Saaz and a number of other varieties. It has herbal and spicy aroma notes with a hint of floral and citrus. Sterling is perceived to be similar to a combination of Saaz and Mt. Hood, and many brewers use it as a replacement for Saaz. It is typically used in Pilsners and Lagers, as well as Belgian-style Ales.

SUMMIT™

Summit™ is a high alpha variety of recent origin that was bred by the American Dwarf Hop Association. It is the first U.S. high alpha variety that can be grown commercially on low and high trellis. The variety exhibits unusually high alpha acids content, high alpha/beta ratios, excellent storage-stability and powdery mildew resistance. Summit™ has a strong aroma profile that includes citrus notes, such as orange, grapefruit and tangerine.



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SUPER GALENA

Super Galena (Hopsteiner 9908) is a super high alpha variety developed by the Hopsteiner breeding program and released in 2006. It has relatively high contents of both alpha and beta acids, making it a good bittering hop with pleasant aroma. Super Galena is comparable to Galena in its aroma and bitterness profile, but offers a substantially higher yield.



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TAHOMA

Tahoma was released by Washington State University in 2013. Tahoma is a daughter of Glacier that retains the very low cohumulone characteristic of Glacier with somewhat higher alpha acid content. Tahoma has a pleasant aroma with subtle lemon citrus notes.

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TETTNANG (US)

Tettnang is a traditional German land-race variety known for its noble aroma that is pleasant and slightly spicy. It remains well established in the Tettnang growing region of Germany, and is also grown in Oregon and Washington. American-grown Tettnang is reported to have slightly higher myrcene levels than its German counterpart.



ULTRA

Ultra was bred by U.S.D.A. from a tetraploid Hallertau mf cultivar and a Saazer-type male diploid genotype. It is a half-sister to Mt. Hood, Liberty, and Crystal. Ultra has a mild and pleasant Saaz-like aroma. It has very low alpha acids compared to most U.S. aroma varieties.

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VANGUARD

Vanguard was bred by Washington State University and released in 1993. It has a reputation of having a very close chemistry and aroma to Hallertau mf. Vanguard is typically used in Lager, Pilsner, Bock, Kölsch, Wheat, Munich, Helles, and Belgian-style Ales.

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WARRIOR®

Warrior® brand YCR 5 cv is a high alpha variety developed by Select Botanicals Group. The variety is used for its mild, clean bittering qualities. It is widely used in American pale ales and IPAs.



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WILLAMETTE

Named after Oregon's Willamette River, which runs through that state's hop growing region, Willamette was released in 1976 from the U.S.D.A. breeding program. It is a daughter of the classic English variety, Fuggle, and is characterized by a low alpha content and mild aroma. Willamette is the most widely grown U.S. aroma hop. It imparts a mild, slightly spicy, and pleasant aroma in beer.



YAKIMA GOLD

Yakima Gold was released by Washington State University in 2013. Yakima Gold, from a cross between Early Cluster and a native Slovenian male, is an excellent general purpose hop with smooth bitterness and a pleasant aroma.

Buyers Guide

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This list is not an endorsement of any of these companies – only a reference for your convenience.



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Hop Growers of America is a non-profit association that represents and promotes the interests of U.S. hop growers both domestically and internationally. HGA provides support, coordination and communication to growers, brewers and the world hop industry in areas of common interest, such as market statistics, promotion, education and research.