2018

USAHOPS

HOP GROWERS OF AMERICA

Contents

Our roots

The first record of commercial hop production in America dates back to 1648, with the establishment of a 45 acre hop garden to supply the first commercial brewery in the Massachusetts Bay settlement. Massachusetts remained the country's most important hop supplier until the 19th century, when production expanded to other New England states. By mid-century, the state of New York commanded the largest US hop acreage, reaching its pinnacle in the last decades of the 19th century. By the turn of the century the new hop regions along the Pacific coast had overtaken New York's production rates. The final curtain for hop growing on the east coast was Prohibition, accompanied by the appearance of downy mildew, which decimated the northeast's hop crop in 1927. With the renewed interest in growing hops, some commercial acreage has returned to the Northeast.

Where we are today

The US Hop Industry currently produces over one-third of the world's hop supply. Previously a major contender in high efficiency alpha, acreage has shifted to be more focused on aroma hops thanks to a shift in preference for vibrant aromatics in beer. However, as global demands for alpha rise, there is certainly plenty of US- grown alpha in the mix.

The epicenter

The Pacific coastal states of Washington, Oregon, and California produced the majority of the United States hop crop in the early 1900s. The end of Prohibition in 1933 resulted in a considerable increase in hop acreage for these states. Idaho expanded its acreage during World War II. California commercial hop production had ceased by 1990, and has now returned in small quantities thanks to renewed interest. The Pacific Northwest offers a favorable climate, fertile soils, plentiful irrigation water, and dedicated multi-generational family farms. These ideal growing conditions paired with irreplaceable multi-generational knowledge result in excellent quality and yields. State of the art post-harvest storage and processing facilities in the region ensure crop quality is maintained and any product desired by the brewing sector can be supplied.

What's old is new

Expansion of the customer base through growth in the craft sector and an increased desire for local materials by both breweries and their customers has created opportunities for new and revived hop production regions throughout the US. These farms are generally smaller in scale than their Pacific Northwest counterparts, but have the ability to respond to specific local hop market requirements.

Hop farming, American style

Hop plants are either male or female, producing annual climbing bines from a perennial "crown" of rhizomes. Hop cones are flowers of the female plant, containing lupulin glands filled with the alpha and beta acids, resins, and oils prized by brewers.

Initial establishment of a hop yard requires a substantial capital investment for planting material, trellis and irrigation system. The 18-foot trellis consists of some 55 poles per acre, connected by heavy wire and cables. Concrete anchors buried five feet deep surround the yard and hold the trellis upright under the heavy weight of the crop that develops late in the season. Hops are normally planted on a 3.5' x 14' spacing. Once established, the hops will produce until virus and disease levels cause yields to decline, or different varieties come into demand. US growers produce over 80 varieties of aroma, high alpha, and dual-purpose hops.

The growing season

Spring pruning removes the vigorous new growth that emerges as soil temperatures increase. These practices also establish consistent bine emergence for ideal training and picking dates. Twining begins in April, as crews use tractor-drawn elevated platforms to tie the twine to overhead trellis wires, while the lower end of the twine is secured into the plant crown with metal clips. The biodegradable twine is either coir (coconut fiber) or paper. Depending on the variety, two to four strings are secured into the crown of each plant.

Training is the practice of wrapping hop shoots in a clockwise direction around the twine, the direction in which they will continue to grow. Two or three strong shoots are started around each string during May. Training time is a critical factor in determining yield, due to the relationship between plant height and day length, which affects flowering. Some growers may decide to train again, depending on the variety and other factors. Hop plants grow rapidly, forming long sidearms and an abundance of foliage during the next several weeks.

Irrigation needs depend on weather and location. Hop fields require about 30 inches of water during the growing season. Drip irrigation allows growers to deliver the exact amount of water and nutrients required by the plant, while eliminating runoff that may impact water quality in local rivers and streams.

Harvest

The annual harvest begins in late August and progresses through late September. Each variety has its own peak maturity time, and must be monitored closely. After hop cones are stripped from bines, specialized equipment removes leaves and stems which are chopped and spread back onto fields to improve the soil. Cleaned cones are immediately transported by conveyor to kilns, where warm air dries the hops for about nine hours, reducing them to 30% of the green weight and 8-9% moisture content.

After cooling for at least 24 hours, dried hops are compressed into 200 pound bales, wrapped in bale cloth, and subjected to quality inspection. Bales are quickly transported to cold storage warehouses to maintain quality until processing or shipment occurs.

Best practices

US hop growers are committed to environmental stewardship. Along with hop merchant companies and brewers, the industry has funded a variety of public research programs through state universities and the United States Department of Agriculture for over 50 years, promoting sustainable production and achieving integrated pest management.

Sustainable production systems emphasize selecting, integrating, and implementing complementary management tactics that are designed to maintain pests at economically acceptable levels. In a sentence, farmers allow Mother Nature a bigger role in their pest management practices by encouraging predatory bugs and insects to those pests which are destructive to hop plants. The basic prerequisite for this approach is promoting healthy plants.

Healthy plants begin with successful hop breeding programs which focus evaluation criteria on superior agronomic traits and disease tolerance, along with important brewing quality characteristics. Research targeting fertility and water management ensures proper application of those inputs, maximizing yields and plant vigor and optimizing vegetative growth while reducing pest and disease susceptibility.

Through research, economic thresholds have been established for pests and diseases throughout various stages of the growing season. These thresholds guide growers in deciding when it may become necessary to intervene to protect their plants. A healthy plant can support a certain level of pest and disease pressure without adversely impacting yield and quality.

USA Hops promotes the use of improved science-based production practices. Continual improvement in varieties, pest and disease management, harvesting technologies, and crop handling are supported by ongoing research and development programs.

Systems-level management

Integrated pest management (IPM) promotes a systems-level approach to the management of agricultural production. Successful IPM programs reduce the abundance of pests and diseases and reduce severity of outbreaks. Hop growers focus on whole-farm planning that incorporates fertility, irrigation, cultural practices, variety selection, and other factors that contribute to the overall health of their crop and its ability to tolerate low levels of pests and diseases without economic damage.

Sustainability must encompass environmental, economic and social factors.

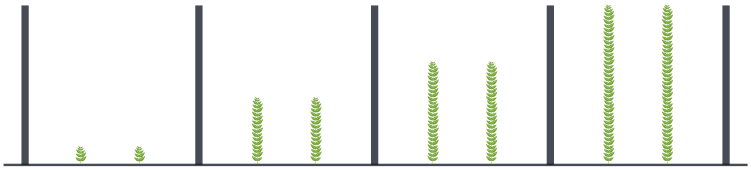
Developing a new hop variety

YEAR 0

CREATE CROSSES AND COLLECT SEEDS. PLANT SEEDS IN GREENHOUSE AND EVALUATE FOR AGRONOMICS AND DISEASE RESISTANCE.

PHASE 1

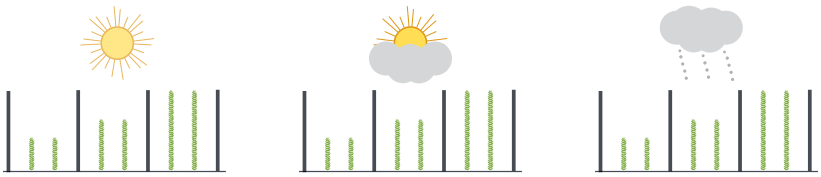
YEAR 3



PLANT SEEDLING IN FIELD. EVALUATE PLANTS ON STRING. EVALUATE DISEASE RESISTANCE, VIGOR, FLOWERING, YIELD POTENTIAL, AND CHEMISTRY.

PHASE 2

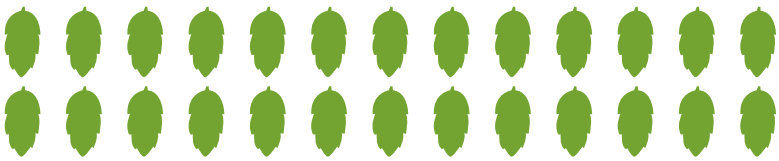
YEAR 5



ESTABLISH MULTI-HILL PLOTS AND CONTINUE EVALUATIONS. EXPAND TESTING TO ADDITIONAL GROWING AREAS.

PHASE 3

YEAR 8



EXPAND TO COMMERCIAL SCALE TEST PLOTS FOR AGRONOMIC, YIELD, AND HARVEST TESTING AND BREWING EVALUATION.

PHASE 4

YEAR ?

DECISION TO COMMERICALIZE AND RELEASE VARIETY TO INDUSTRY.

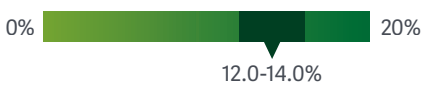
CHINOOK

#2 VARIETY!*

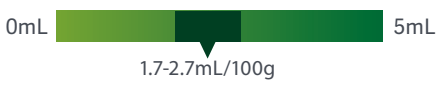
Chinook was developed by the USDA breeding program in Washington State and released in 1985 as a high alpha variety. It has a highly acceptable beer aroma profile with smooth bitterness and full flavor.

MEDIUM INTENSE
SPICY PINE
DISTINCTIVE GRAPEFRUIT

ALPHA



TOTAL OILS



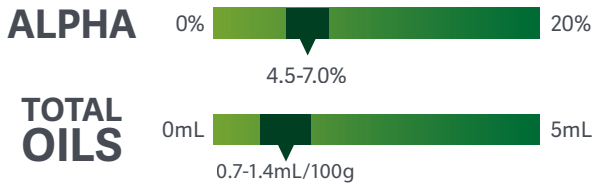
* Based on acreage

CASCADE

#1 VARIETY!*

Cascade is an aroma hop that came out of the USDA breeding program in Corvallis, Oregon and was released in 1972. It has a medium strength aroma and provides a unique aroma profile with citrus, grapefruit, floral, and spicy notes, along with well-balanced bittering potential. It is the most popular hop with the US craft brewing industry and has long been used by major brewers to provide unique flavor and aroma profiles. Cascade is the most widely grown US hop variety, with new acreage being established each year in numerous states across the country to meet increasing demand.

FLORAL **CITRUS**
SPICY GRAPEFRUIT



* Based on acreage

History

The beginnings of Cascade, originally known as 56013, read like a stroke of fate for the iconic aroma hop that has been credited as a catalyst of American craft beer as we know it today. If hops are like people, then Cascade's grandparents are a female Fuggle and a male Serebrianka-derived plant, bearing its mother which was then wind-pollinated by an unknown male, and was discovered in 1956.

Essentially "sitting on the shelf" until Dr. Jack Horner took over the breeding program in 1967, Cascade was then put into a test plot with the intention of being a strong competitor to European aroma hops. Due to its strong aroma, enthusiasm wasn't equally met by brewers for several more years. But when it was, Cascade was embraced and the rest is history, now a pillar in the brewing community and a strong component to American craft aroma.

Alpha...aroma...a sprinkling of both

The US hop industry has long been synonymous with high alpha production. Certain varieties of hops are champs in the production of high levels of alpha acid, and the resulting hop extract provides brewers worldwide with this important bittering component. US growers also produce an array of fine aroma hops that allow brewers to customize the profile of each unique beer. However, many of the interesting aroma-type hops that have been developed and grown in the US for decades have found popularity with brewers who are looking for distinctive flavors and aromas, around which a dizzying array of beer styles and specialty brews can be developed. Many of these hops also contain respectable amounts of alpha acid and can serve as dual-purpose superstars in the brewing process.

Arranged marriages

Genetically diverse breeding lines are required for a successful variety development program. The maintenance of several acres of hop selections from around the world ensures access to various combinations of traits. Skilled plant breeders evaluate the genetic profile of potential parents when selecting candidates for a natural cross, hoping some of the seedlings will exhibit desirable traits from each parent. One cross may yield hundreds of seeds, each containing a slightly different genetic combination. Only a small percentage may exhibit the desired traits and potential for commercial population.

Public & proprietary

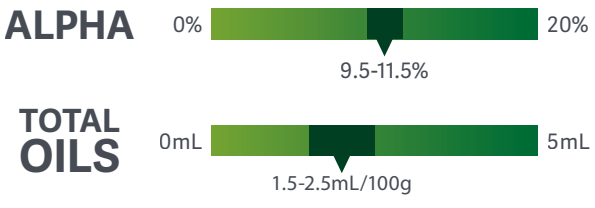
The US hop industry's success has been fueled by a network of excellent variety development programs in both the public and private sectors. The USDA Agricultural Research Service in Corvallis, Oregon, and Washington State University's Irrigated Agriculture Research and Extension Center in Prosser, Washington have released many unique varieties that have revolutionized the US hop industry. More recently, US growers and merchants have invested heavily in a number of proprietary programs. Using conventional breeding techniques and seed collection, these programs produce tens of thousands of seedlings annually, launching a continual flow of new experimental material into the evaluation process. Rigid selection standards for disease susceptibility, agronomic characteristics, yield, harvesting and drying factors, and brewing quality ensure only the best selections are carried forward to the next level of testing. Varietal development is a "numbers game," requiring 10-20 years from cross to commercialization. The ability to select from the "cream of the crop" across several programs creates tremendous opportunities for brewers to find the perfect hop!

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 contributors from Fuggle, East Kent Golding and others. It is among the most popular varieties for US craft brewers and is sometimes referred to as a super Cascade.

MEDIUM INTENSE

CITRUS **FLORAL**

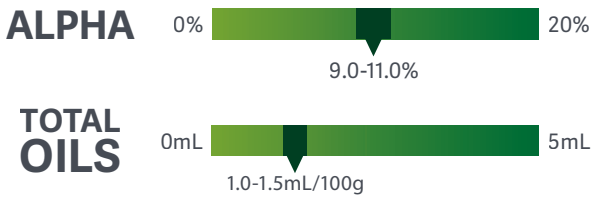


COMET

Comet was released by the USDA in 1974 to meet the need for a higher alpha-acid producing hop. It is a cross between English Sunshine and a native North American variety. Comet's storage stability is very good and has a pungent, wild American aroma with citrus flavors.

GRAPEFRUIT

CITRUS



CTZ

Columbus, Tomahawk®, and Zeus are often grouped together and labeled as CTZ. They are referred to as Super High Alpha varieties, having alpha acid content of between 14.5-16.5%.

FENNEL
CITRUS
ANISEED
NETTLE

ALPHA
0% — 20%
14.5-16.5%

TOTAL OILS
0mL — 5mL
2.0-3.0mL/100g

TRIPLEPEARL

TriplePearl is a triploid daughter of Perle that was released by USDA-ARS in late 2013. It has a pleasant, mellow aroma with notes of orange-citrus, orange rind/zest, melon, resin, spice and slight pepper.

ORANGE ZEST
RESIN
ORANGE-CITRUS
SPICY
MELON
PEPPER

ALPHA
0% — 20%
10.2-11.2%

TOTAL OILS
0mL — 5mL
1.1-1.8mL/100g

CASHMERE

Cashmere was released by Washington State University in 2013. A daughter of Cascade, it includes Northern Brewer germplasm through the male parent. Cashmere contains no farnescene and twice as much humulene as Cascade. It is unique, pleasant, complex and powerful.

COCONUT
FRUITY
SPICY
MELON
LEMON
LIME PEEL
PINEAPPLE

ALPHA
0% — 20%
7.7-9.1%

TOTAL OILS
0mL — 5mL
1.2-1.4mL/100g

WILLAMETTE

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

CURRY
CITRUS
INCENSE
CARAMEL
ELDERBERRY

ALPHA
0% — 20%
4.0-6.0%

TOTAL OILS
0mL — 5mL
1.0-1.5mL/100g

CLUSTER

Cluster is the oldest hop variety grown in the US Until the late 1970's, Cluster was one of only a few varieties growing in the US 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.

SPICY **FLORAL**

ALPHA 0% — 20%

5.5-8.5%

TOTAL OILS 0mL — 5mL

0.4-0.8mL/100g

CRYSTAL

Crystal is a mild aroma hop with spicy and floral characteristics. Half sister of Mt. Hood and Liberty, Crystal is a triploid variety derived from Hallertau Mittelfrüh and other crosses, Cascade being a primary contributor. Released from the USDA in 1993, it has become popular in US craft brewing, particularly in IPAs.

FLORAL **MILD** **SPICY**

ALPHA 0% — 20%

3.5-5.5%

TOTAL OILS 0mL — 5mL

1.0-1.5mL/100g

VARIETY	ALPHA/ BETA%	COHUM	OILS*	AROMA
AHTANUM™ YCR 1	5.7 - 6.3 / 5.0 - 6.5 %	30 - 35 %	0.8 - 1.2	FLORAL, EARTHY, CITRUS, GRAPEFRUIT
ALPHAROMA	5.8 - 10.9 / 2.4 - 4.8 %	27 %	0.98 - 1.52	TROPICAL FRUIT, PASSIONFRUIT, PEACH
AMARILLO®	8.0 - 11.0 / 6.0 - 7.0 %	21 - 24 %	1.5 - 1.9	BLACK TEA, LEMON, PEACH, MELON, APRICOT, GRAPEFRUIT
APOLLO™	15.0 - 19.0 / 5.5 - 8.0 %	24 - 28 %	1.5 - 2.5	AROMATIC, PLEASANT, GRAPEFRUIT
AZACCA™ ADHA-483	14.0-16.0 / 4.0-5.5 %	38-45 %	1.6 - 2.5	MANGO, PAPAYA, ORANGE, GRAPEFRUIT, LEMON, PINEY, SPICY, PINEAPPLE, GRASSY, TROPICAL FRUIT, CITRUS
BITTER GOLD	15.5-18.8 / 6.1-8.0 %	36 - 41 %	0.8 - 3.9	FRUITY, TROPICAL, CITRUS, FRESH CUT GRASS
BRAVO™	14.0-17.0 / 3.0-5.0 %	29 - 34 %	1.6 - 2.4	PLEASANT, FRUITY, FLORAL
BREWER'S GOLD (US)	8.0-10.0 / 3.5-4.5 %	40 - 48 %	2.0 - 2.4	BLACKCURRANT, FRUITY, SPICY
CALYPSO™	12.0-14.0 / 5.0-6.0 %	40 - 42 %	1.6 - 2.5	PLEASANT FRUITY AROMA, PEAR, APPLE
CASCADE	4.5 - 7.0 / 4.8 - 7.0 %	33 - 40 %	0.7 - 1.4	FLORAL, SPICY, CITRUS, GRAPEFRUIT
CASHMERE	7.7 - 9.1 / 6.4 - 7.1 %	22 - 24 %	1.6 - 2.5	MELON, FRUITY (LEMON, LIME PEEL, PINEAPPLE), COCONUT, SPICY
CENTENNIAL	9.5 - 11.5 / 3.5 - 4.5 %	29 - 30 %	1.5 - 2.5	MEDIUM INTENSE, FLORAL, CITRUS
CHELAN	12.0-14.5 / 8.5-9.8 %	33 - 35 %	1.5 - 1.9	PLEASANT CITRUS
CHINOOK	12.0-14.0 / 3.0-4.0 %	29 - 35 %	1.7 - 2.7	MEDIUM INTENSE, SPICY, PINE, GRAPEFRUIT
CITRA® HBC 394	11.0-13.0 / 3.5-4.5 %	22 - 24 %	2.2 - 2.8	STRONG CITRUS, TROPICAL FRUIT
CLUSTER	5.5 - 8.5 / 4.5 - 5.5 %	37 - 43 %	0.4 - 0.8	FLORAL, SPICY
COLUMBIA	6.8 - 11.5 / 2.9-5.6 %	~40 %	0.5 - 1.6	SUBTLE EARTH, MILD FRUIT
COLUMBUS	14.5-16.5 / 4.0-5.0 %	28 - 32 %	2.0 - 3.0	CITRUS, FENNEL, NETTLE, ANISEED
COMET	9.0 - 11.0 / 4.0 - 6.0 %	38 - 42 %	1.0 - 1.5	GRAPEFRUIT AND CITRUS
CRYSTAL	3.5 - 5.5 / 4.5 - 6.5 %	20 - 26 %	1.0 - 1.5	MILD, SPICY, FLORAL
CTZ	14.5-16.5 / 4.0-5.0 %	28 - 32 %	2.0 - 3.0	CITRUS, FENNEL, NETTLE, ANISEED
DELTA™	5.5 - 7.0 / 5.5 - 7.0 %	22 -24 %	0.5 - 1.1	SLIGHTLY SPICY WITH A HINT OF CITRUS
DENALI™	13.0-15.0 / 4.0-5.0 %	22 - 26 %	2.5 - 4.0	PINEAPPLE, PINE, CITRUS
EKUANOT™ HBC 366	13.0-15.5 / 4.0-5.0 %	31 - 36 %	2.5 - 4.0	CITRUS, TROPICAL FRUIT, FRUITY, HERBAL
EL DORADO®	14.0-16.0 / 7.0-8.0 %	23 - 33 %	2.5 - 2.8	TROPICAL FRUIT, PEAR, WATERMELON, STONE FRUIT
EROICA	7.3 - 14.9 / 3.0 - 5.3 %	~40 %	~0.9	FORWARD FRUIT FLAVORS

VARIETY	ALPHA/ BETA%	COHUM	OILS*	AROMA
EUREKA!™	17.0 - 19.0 / 5.0 - 6.0%	28-30%	2.5 - 3.5	BLACK CURRANT, DARK FRUITS, STRONG HERBAL NOTES, PINE TREE
FIRST GOLD	5.6-9.3 / 2.3-4.1 %	32-34%	0.7 - 1.5	SPICY, SIMILAR TO GOLDING
FUGGLE(US)	4.0-5.5 / 1.5-2.0 %	25-32%	0.7 - 1.2	WOODY, FRUITY
GALENA	11.5-13.5 / 7.2-8.7 %	36 - 40 %	0.9 - 1.3	CITRUS, LIME, GOOSEBERRY, BRANDY, PEAR, PINEAPPLE, SPICY
GLACIER	4.0-7.5 / 7.0-10.0 %	13-16%	0.8 - 1.0	FRUITY, CEDAR
GOLDING (US)	4.0 - 6.0 / 2.0 - 3.0 %	23 - 28 %	0.7 - 1.0	MILD, DELICATE, SWEET FLORAL
HALLERTAU (US)	3.5 - 5.5 / 3.5 - 5.5 %	18 - 24 %	0.6 - 1.0	MILD, SPICY, HERBAL, FLORAL
HORIZON	11.0-13.0 / 6.5-8.5 %	16 - 19 %	0.5 - 2.0	FLORAL, SPICY
IDAHO 7™	9.5-14.0 / 3.9-5.0 %	38.2 %	1.0 - 1.8	PINEAPPLE, PEACH, PINE, RESIN, MANGO, BLACK TEA
JARRYLO™ ADHA- 881	15.0-17.0 / 6.0-7.5 %	34 - 37 %	3.6 - 4.3	BANANA, GRASSY, PEAR, ORANGE, SPICY, FRUIT
LEMONDROP™	5.0 -7.0 / 4.0-6.0 %	28 - 34 %	1.5 - 2.0	LEMON, MINT, GREEN TEA, SLIGHT MELON/MANGO
LIBERTY	3.0 - 5.0 / 3.0 - 4.0 %	24 - 30 %	0.6 - 1.2	MILD, SLIGHTLY SPICY
LORAL™ HBC 291	11.3-12.2 / 4.9-5.3 %	21 - 24 %	1.8 - 2.9	FLORAL, CITRUS, FRUITY, HERBAL
MAGNUM (US)	12.0 -14.0 / 4.5-6.0 %	24 - 28 %	1.9 - 2.3	NOT DISTINCT
MERIDIAN	6.0-7.0 / 6.0-9.0 %	45 %	1.0 - 1.4	LEMON, MIXED BERRIES, TROPICAL FRUIT
MILLENNIUM	14.5 -16.5 / 4.3-5.3 %	28 - 32 %	1.8 - 2.2	STRAWBERRY, ELDERFLOWER, CHOCOLATE, TOFFEE, PEAR
MOSAIC® HBC 369	11.5 -13.5 / 3.2 -3.9 %	24 - 26 %	1.0 - 1.5	PEAR, GOOSEBERRY, MANDARIN, LIME, PEACH
MT. HOOD	4.0 - 7.0 / 5.0 - 8.0 %	21 - 23 %	1.2 - 1.7	HONEY, LEMON CAKE, LEMON TEA, TARRAGON, FENNEL
MT. RAINIER	8.0 - 10.8 / 7.6 - 9.3 %	21 - 23 %	1.8 - 2.7	FLORAL AND NOBLE AROMA, CITRUS, LICORICE
NEWPORT	13.5 -17.0 / 7.2-9.1 %	36 - 38 %	1.6 - 3.4	MILD
NORTHERN BREWER (US)	8.0 -10.0 / 3.0-5.0 %	20 - 30 %	1.5 - 2.0	MEDIUM INTENSITY, PINE, MINT
NUGGET	11.5 -14.0 / 4.2-5.8 %	22 - 26 %	1.8 - 2.2	LIME, GINGER, PINEAPPLE, GERANIUM, LYCHEE
OLYMPIC	10.6 -13.8 / 3.8-6.1 %	~31 %	0.8 - 2.5	CITRUS, SUBTLE SPICE
PALISADE® YCR 4	5.5 - 9.5 / 6.0 - 8.0 %	24 - 29 %	1.4 - 1.6	ORANGE, APRICOT, PASSION FRUIT, HONEY, YOGURT
PERLE (US)	7.0 - 9.5 / 4.0 - 5.0 %	27 - 32 %	0.7 - 0.9	SLIGHTLY SPICY, HERBAL, FLORAL
PEKKO™ ADHA-871	13.0-16 .0 / 3.5-4.25 %	27 - 30%	2.1 - 2.7	PLEASANT, FLORAL, CITRUS, MINT, HERBAL, MELLOW, PINEAPPLE, THYME, SAAZ, CUCUMBER, SAGE, LEMON
PERLE (US)	7.0 - 9.5 / 4.0 - 5.0 %	27 - 32 %	0.7 - 0.9	SLIGHTLY SPICY, HERBAL, FLORAL
SAAZ (US)	3.0 - 4.5 / 3.0 - 4.5 %	24 - 28 %	0.5 - 1.0	MILD SPICE, EARTH
SANTIAM	5.0 - 7.0 / 6.0 - 8.0 %	22 - 24 %	1.3 - 1.5	HERBAL, NOBLE HOP AROMA
SIMCOE® YCR 14	12.0 -14.0 / 4.0-5.0 %	15 - 20 %	2.0 - 2.5	UNIQUE PINE-LIKE AROMA
SORACHI ACE	12.0 -13.0 / 8.8-9.9 %	23 - 27 %	2.8 - 3.2	UNIQUE LEMON AND DILL
STERLING	6.0 - 9.0 / 4.0 - 6.0 %	22 - 28 %	1.3 - 1.9	HERBAL, SPICY, HINT OF FLORAL, CITRUS
SUMMIT™	16.0 -18.0 / 4.0-6.0 %	26 - 33 %	1.5 - 2.5	PEPPER, GOOSEBERRY, WILD GARLIC, INCENSE, ANISEED
SUPER GALENA™	13.0-16.0 / 8.0-10 %	35 - 40 %	1.5 - 2.5	CITRUS, SIMILAR TO GALENA
TAHOMA	7.2 - 8.2 / 8.5 - 9.5 %	15 - 17 %	1.0 - 2.0	CITRUS (LEMON, SLIGHT GRAPEFRUIT), CEDAR WOOD, PINE, SPICY
TETTNANG (US)	4.0 - 5.0 / 3.0 - 4.0 %	20 - 25 %	0.4 - 0.8	MILD, SLIGHTLY SPICY
TOMAHAWK® F10	14.5-16.5 / 4.0-5.0 %	28 - 32 %	2.0 - 3.0	CITRUS, FENNEL, NETTLE, ANISEED
TRIPLE PEARL	10.2 -11.2 / 3.3-4.2 %	22 - 25 %	1.1 - 1.8	ORANGE-CITRUS, ORANGE RIND/ZEST, MELON, RESIN, SPICY, SLIGHT PEPPER
ULTRA	2.0 - 3.5 / 3.0 - 4.5 %	23 - 38 %	0.5 - 1.0	MILD, PLEASANT, SAAZ-LIKE
VANGUARD	5.5 - 6.0 / 6.0 - 7.0 %	14 - 16 %	0.9 - 1.2	MILD, PLEASANT, SIMILAR TO HALLERTAU MITTELFRUEH
WARRIOR® YCR 5	15.0 -18.0 / 4.3-5.3 %	22 - 26 %	1.3 - 1.7	VERY MILD
WILLAMETTE	4.0 - 6.0 / 3.5 - 4.5 %	30 - 35 %	1.0 - 1.5	CITRUS, INCENSE, ELDERBERRY, CARAMEL, CURRY
YAKIMA GOLD	8.8-10.5 / 4.3 - 5.0 %	21 - 23 %	1.9 - 2.3	GRAPEFRUIT, LEMON ZEST, LEMONGRASS, SLIGHT SPICE
ZEUS	12.0-16.5 / 4.0-6.0 %	27 - 35 %	1.0 - 2.0	AROMATIC, PLEASANT

This listing is not a comprehensive list of all U.S. varieties. If you are a proprietary hop owner and would like to add or change a variety in our list, please email admin@usahops.org with all the listing information. We cannot guarantee a listing.

* OILS = ML/100G

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