



Hopunion CBS, LLC

Directory of Hop Data

US AHTANUM.....	3
US AMARILLO	4
US BREWER'S GOLD	5
US CASCADE.....	6
US CENTENNIAL	7
US CHINOOK.....	8
US CLUSTER.....	9
US COLUMBUS	10
US CRYSTAL	11
US FUGGLE.....	12
US GALENA.....	13
US GLACIER.....	14
US GOLDING	15
US HALLERTAU	16
US HORIZON	17
US LIBERTY	18
US MAGNUM.....	19
US MILLENIUM	20
US MOUNT HOOD	21
US NEWPORT.....	22
US NORTHERN BREWER.....	23
US NUGGET	24
US PERLE	25
US SAAZ.....	26
US SANTIAM	27
US SIMCOE™	28
US STERLING.....	29
US TETTNANG	30
US VANGUARD	31
US WARRIOR™	32
US WILLAMETTE.....	33
CZECH SAAZ.....	34
FRENCH STRISSELSPALT	35
GR BREWER'S GOLD	36
GR HALLERTAU.....	37
GR HERSBRUCKER.....	38
GR MAGNUM.....	39



Hopunion CBS, LLC

GR NORTHERN BREWER	40
GR PERLE.....	41
GR SELECT	42
GR SPALT.....	43
GR TETTNANG.....	44
GR TRADITION	45
NZ ORGANIC HALLERTAU.....	46
NZ ORGANIC PACIFIC GEM.....	47
AU PRIDE OF RINGWOOD.....	48
STYRIAN GOLDING.....	49
UK CHALLENGER.....	50
UK FIRST GOLD.....	51
UK FUGGLE.....	52
UK KENT GOLDING.....	53
UK NORTHDOWN	54
UK PROGRESS	55
UK TARGET.....	56



Hopunion CBS, LLC

US AHTANUM

Pedigree	Open pollination
Maturity	Medium-late
Yield	1990 – 2190 kg./ha. or 1775 – 1950 lb./ac.
Growth Habit	Good
Disease/Pest Susceptibility	Tolerant to downy mildew and Peronospora
Pickability/Drying/Baling	Good
Cone-Structure	Small, compact cone
Lupulin	Fairly yellow, similar to Cascade
Aroma	Floral
Alpha Acids	5.7 – 6.3% w/w
Beta Acids	5 – 6.5% w/w
Co-Humulone	30 – 35% of alpha acids
Storageability	Fair to good
Total Oil	0.8 – 1.2 mls/100 grams
Myrcene	50 – 55% of whole oil
Humulene	16 – 20% of whole oil
Caryophyllene	9 – 12% of whole oil
Farnesene	<1% of whole oil
General Trade Perception	Used for its aromatic properties and moderate bittering.
Possible Substitutions	Cascade, Amarillo
Typical Beer Styles	Lager, American Ales
Additional Information	Quite similar to Cascade
Personal Notes:	



Hopunion CBS, LLC

US AMARILLO

Pedigree	Privately grown and registered.
Maturity	Mid-season
Yield	Not determined yet
Growth Habit	Good
Disease/Pest Susceptibility	Fairly resistant to all diseases
Pickability/Drying/Baling	Good
Cone-Structure	Small, tight cone
Lupulin	Plentiful
Aroma	Floral and citrusy
Alpha Acids	8 – 11% w/w
Beta Acids	6 – 7% w/w
Co-Humulone	21 – 24 of alpha acids
Storageability	Average
Total Oil	1.5 – 1.9 mls/100 grams
Myrcene	68 – 70% of whole oil
Humulene	9 – 11% of whole oil
Caryophyllene	2 – 4% of whole oil
Farnesene	2 – 4% of whole oil
General Trade Perception	Gaining acceptance, viewed somewhat as a Cascade type
Possible Substitutions	Cascade, Centennial, possibly Chinook or Ahtanum
Typical Beer Styles	American Ales, IPA
Additional Information	Very limited acreage at this time.
Personal Notes:	



Hopunion CBS, LLC

US BREWER'S GOLD

Pedigree	A sibling of Bullion developed by Professor Salmon in 1934
Maturity	Medium to late
Yield	2750 kg./ha. or 2400 lb./ac.
Growth Habit	Normal
Disease/Pest Susceptibility	Low resistance to wilt and powdery mildew
Pickability/Drying/Baling	Good
Cone-Structure	Over-sized, compact cone
Lupulin	Unknown
Aroma	Blackcurrant, fruity, spicy
Alpha Acids	8 – 10% w/w
Beta Acids	3.5 – 4.5% w/w
Co-Humulone	40 – 48% of alpha acids
Storageability	Poor
Total Oil	2.0 – 2.4 mls/100 grams
Myrcene	37 – 40% of whole oil
Humulene	29 – 31% of whole oil
Caryophyllene	7 – 7.5% of whole oil
Farnesene	<1% of whole oil
General Trade Perception	Mainly used as a bittering hop
Possible Substitutions	Bullion
Typical Beer Styles	Ale, Pilsners & Lambic
Additional Information	Limited acreage in the US
Personal Notes:	



Hopunion CBS, LLC

US CASCADE

Pedigree	Open pollination of a Fuggle seedling, itself derived from crosses between Fuggle and the Russian hop Serebrianker.
Maturity	Mid-Season
Yield	1600 – 2200 kg./ha or 1430 – 1960 lb./ac.
Growth Habit	Good to excellent
Disease/Pest Susceptibility	Not seriously affected by Prunus necrotic ring-spot virus. Good crown and cone resistance to downy mildew, partly tolerant to Verticillium wilt. Prone to insects, especially Aphids.
Pickability/Drying/Baling	Good
Cone-Structure	Compact, medium sized, slightly square-shaped
Lupulin	Moderate amount, yellow color; develops compact balls of Lupulin in the cone; unique to Cascade
Aroma	Flowery and citrusy. Can have a grapefruit note.
Alpha Acids	4.5 – 7.0% w/w
Beta Acids	4.5 – 7.0% w/w
Co-Humulone	33 – 40% of alpha acids
Storageability	48 – 52% alpha acids remaining after 6 months storage at 20°C
Total Oil	0.8 – 1.5 mls/100 grams
Myrcene	45 – 60% of whole oil
Humulene	10 - 16% of whole oil
Caryophyllene	3 - 6% of whole oil
Farnesene	4 – 8 % of whole oil
General Trade Perception	Aroma variety with well-balanced bittering potential. It is the most popular hop with the craft-brewing industry. Good for dry hopping.
Possible Substitutions	Centennial, Amarillo, to a lesser extent, Columbus
Typical Beer Styles	American-Style Ales, especially Pale Ale, IPA, Porter, Barley wines; Can also be used in Witbier.
Additional Information	Released in 1972 and well-established in US industry. The first commercially accepted American-bred aroma hop.
Personal Notes:	



Hopunion CBS, LLC

US CENTENNIAL

Pedigree	Selected from a cross between Brewer's Gold and a selected USDA male.
Maturity	Mid-season
Yield	1700 – 2000 kg./ha. or 1500 – 1750 lb./ac.
Growth Habit	Good and neat, well-hopped down
Disease/Pest Susceptibility	No visible reaction to infection with Prunus necrotic ring-spot virus. Moderately resistant to downy mildew and Verticillium wilt.
Pickability/Drying/Baling	Good
Cone-Structure	Medium-sized, dense, compact cone
Lupulin	Abundant, dark yellow in color
Aroma	Medium intensity with floral and citrus tones
Alpha Acids	9.5 – 11.5% w/w
Beta Acids	3.5 – 4.5% w/w
Co-Humulone	29 – 30% of alpha acids
Storageability	60 – 65% alpha acids remaining after 6 months storage at 20° C
Total Oil	1.5 – 2.3 mls/100 grams
Myrcene	45 – 55% of whole oil
Humulene	10 – 18% of whole oil
Caryophyllene	5 – 8% of whole oil
Farnesene	<1% of whole oil
General Trade Perception	Very balanced hop, sometimes called a super Cascade
Possible Substitutions	Cascade, possibly Columbus or Chinook. Analytically a blend of 70% Cascade and 30% Columbus will give similar profile.
Typical Beer Styles	All US Ale styles, has been used with US Wheat beers
Additional Information	Named from the Washington State Centennial Celebration. At one time this variety was going to be destroyed for lack of interest by the world's major breweries. Today has found a very favorable following by craft-brewers.

Personal Notes:



Hopunion CBS, LLC

US CHINOOK

Pedigree	From a cross between Petham Golding and a USDA-selected male with high alpha acids and good storage properties.
Maturity	Mid to late season
Yield	2000 – 2500 kg./ha. or 1780 – 2230 lb./ac.
Growth Habit	Good
Disease/Pest Susceptibility	Tolerant to infection with Prunus necrotic ring-spot virus, moderately resistant to downy mildew. Not excessively sensitive to insects.
Pickability/Drying/Baling	Good
Cone-Structure	Long, medium-compact with turned outward petals
Lupulin	Abundant and yellow-orange color
Aroma	Medium intensity, spicy, piney, distinctive grapefruit
Alpha Acids	12.0 – 14.0% w/w
Beta Acids	3.0 – 4.0% w/w
Co-Humulone	29 – 34% of alpha acids
Storageability	65 – 70% alpha acids remaining after 6 months storage at 20° C
Total Oil	1.5 – 2.5 mls/100 grams
Myrcene	35 – 40% of whole oil
Humulene	20 – 25% of whole oil
Caryophyllene	9 – 11% of whole oil
Farnesene	<1% of whole oil
General Trade Perception	A high alpha-acids hop with an acceptable aroma profile.
Possible Substitutions	Nugget, Columbus, Northern Brewer, Wye Target, possibly Centennial
Typical Beer Styles	US Style Pale Ale, IPA, Stout, Porter, Barley Wine, Lager (Bittering)
Additional Information	Released in the US industry in 1985 and becoming increasingly popular with craft-brewers.

Personal Notes:



Hopunion CBS, LLC

US CLUSTER

Pedigree	Not known but possibly a result of a cross between an English variety and an American male hop.
Maturity	Early to late
Yield	1900 – 2400 kg. /ha. or 1700 – 2140 lb. /ac.
Growth Habit	Vigorous but manageable
Disease/Pest Susceptibility	Very susceptible to downy mildew. Not seriously affected by Prunus necrotic ring-spot virus.
Pickability/Drying/Baling	Good
Cone-Structure	Medium-compact cone
Lupulin	Plentiful, yellow in color
Aroma	Floral and spicy
Alpha Acids	5.5 – 8.5% w/w
Beta Acids	4.5 – 5.5 %w/w
Co-Humulone	36 – 42% of alpha acids
Storageability	80 – 85% alpha acids remaining after 6 months storage at 20° C
Total Oil	0.4 – 0.8 mls/100 grams
Myrcene	45 – 55% of whole oil
Humulene	15 – 18% of whole oil
Caryophyllene	6 – 7% of whole oil
Farnesene	<1% of whole oil
General Trade Perception	An excellent general purpose hop with medium and well-balanced bittering potential and no undesirable aroma properties.
Possible Substitutions	Galena, possibly US Northern Brewer
Typical Beer Styles	Ale (Aroma), Lager (Bittering), Stout
Additional Information	For years the standard US cultivar, improved mass selection in the mid-sixties. Limited acreage grown today.
Personal Notes:	



Hopunion CBS, LLC

US COLUMBUS

Pedigree	Bred and selected from the Hopunion breeding program.
Maturity	Mid-season to late
Yield	2250 – 2800 kg./ha. or 2000 – 2500 lb./ac.
Growth Habit	Excellent
Disease/Pest Susceptibility	Has sensitivity to powdery mildew and some sensitivity to downy mildew.
Pickability/Drying/Baling	Good
Cone-Structure	Medium to large dense, rounded cone
Lupulin	Plentiful, pale to mid-yellow
Aroma	Pungent
Alpha Acids	14 – 16% w/w
Beta Acids	4.5 – 5.5% w/w
Co-Humulone	30 – 35% of alpha acids
Storageability	Below average alpha acids remaining after 6 months storage at 20° C
Total Oil	1.5 – 2.0 mls/100 grams
Myrcene	25 – 45% of whole oil
Humulene	15 – 25% of whole oil
Caryophyllene	8 – 12% of whole oil
Farnesene	<1% of whole oil
General Trade Perception	Originally bred for its alpha value, it has also become popular for its oil profile. Great for dry hopping.
Possible Substitutions	Nugget, Chinook, Wye Target, Northern Brewer, possibly Centennial
Typical Beer Styles	US IPA, US Pale Ale, Stout, Barley Wine, Lager (Bittering)
Additional Information	Also know as Tomahawk. Considered similar to Zeus.
Personal Notes:	



Hopunion CBS, LLC

US CRYSTAL

Pedigree	A triploid variety developed from the German Hallertau aroma hop variety with primary contributions from Cascade, Brewer's Gold and Early Green. Released in 1993 to the hop industry.
Maturity	Mid-season
Yield	1350 – 2250 kg./ha. Or 1200 – 2000 lb./ac.
Growth Habit	A fairly strong growing hop
Disease/Pest Susceptibility	Somewhat susceptible to downy mildew.
Pickability/Drying/Baling	Good
Cone-Structure	Medium-sized fairly neat cone
Lupulin	Moderately abundant, normal yellow color
Aroma	Mild, spicy & flowery
Alpha Acids	3.5 – 5.5% w/w
Beta Acids	4.5 – 6.5% w/w
Co-Humulone	20 – 26% of alpha acids
Storageability	50% alpha acids remaining after 6 months storage at 20° C
Total Oil	1.0 – 1.5 mls/100 grams
Myrcene	40 – 65% of whole oil
Humulene	18 – 24% of whole oil
Caryophyllene	4 – 8% of whole oil
Farnesene	<1% of whole oil
General Trade Perception	Very popular in the craft-brewing industry. Viewed as the most pungent of the new triploid Hallertau family of hops.
Possible Substitutions	Mt. Hood, Hersbruck, French Strisselspalt, Liberty, Hallertau
Typical Beer Styles	Pilsner, Lager, Kölsch, ESB, Alt, Belgian-Style Ales
Additional Information	Primarily grown in Oregon. Acreage is increasing. Released in the 1990's.
Personal Notes:	



Hopunion CBS, LLC

US FUGGLE

Pedigree	A chance seedling selected in 1875 by Mr. Richard Fuggle in England. It has been in the US since the late 1800's.
Maturity	Early
Yield	1200 – 1800 kg./ha. or 1070 – 1600 lbs./ac.
Growth Habit	Neat and manageable
Disease/Pest Susceptibility	Not seriously affected by Prunus necrotic ring-spot virus. Resistant to downy mildew. Not excessively sensitive to insects.
Pickability/Drying/Baling	Good
Cone-Structure	Small and rather light, medium-compact
Lupulin	Moderate amount, yellow color
Aroma	Mild, woody and fruity
Alpha Acids	4.0 – 5.5% w/w
Beta Acids	1.5 – 2.0% w/w
Co-Humulone	25 – 32% of alpha acids
Storageability	60 – 65% alpha acids remaining after 6 months storage at 20° C
Total Oil	0.7 – 1.2 mls/100 grams
Myrcene	40 – 50% of whole oil
Humulene	20 – 26% of whole oil
Caryophyllene	6 – 10% of whole oil
Farnesene	4 – 5% of whole oil
General Trade Perception	Traditional English-type aroma hop
Possible Substitutions	UK Fuggle, Willamette, Styrian Golding, US Tettnang
Typical Beer Styles	Any English-style beer or American Ales, Lambic
Additional Information	Also known overseas as Styrian (Savinja) Golding in Slovenia and as UK Fuggle in England. In the US it has been replaced in part by Willamette (triploid Fuggle), which growers find more favorable.

Personal Notes:



Hopunion CBS, LLC

US GALENA

Pedigree	Bred from Brewer's Gold by open pollination in the state of Idaho.
Maturity	Early to mid-season
Yield	1900 – 2500 kg./ha. or 1700 – 2230 lb./ac.
Growth Habit	Neat and columnar
Disease/Pest Susceptibility	Exhibits reaction to infection with Prunus necrotic ring-spot virus. Some resistance to downy mildew, slightly susceptible to powdery mildew, susceptible to aphids.
Pickability/Drying/Baling	Good
Cone-Structure	Medium-compact and plump
Lupulin	Abundant, yellow in color
Aroma	Citrusy
Alpha Acids	12 – 14% w/w
Beta Acids	7 – 9% w/w
Co-Humulone	38 – 42% of alpha acids
Storageability	75 – 80% alpha acids remaining after 6 months storage at 20° C
Total Oil	0.9 – 1.2 mls/100 grams
Myrcene	55 – 60% of whole oil
Humulene	10 – 15% of whole oil
Caryophyllene	3 – 5% of whole oil
Farnesene	<1% of whole oil
General Trade Perception	An excellent high alpha acids hop with balanced bittering properties combines with a good aroma profile.
Possible Substitutions	Nugget
Typical Beer Styles	Can be used in most English-style and American Ales.
Additional Information	Released in 1978.
Personal Notes:	



Hopunion CBS, LLC

US GLACIER

Pedigree	Released in 2000
Maturity	Mid-season
Yield	2750 – 2900 kg./ha. or 2400 – 2600 lb./ac.
Growth Habit	Good
Disease/Pest Susceptibility	Susceptible to powdery and downy mildew
Pickability/Drying/Baling	Good
Cone-Structure	Small cone
Lupulin	Moderately abundant
Aroma	Excellent, pleasant hoppiness
Alpha Acids	5.5% w/w
Beta Acids	8.2% w/w
Co-Humulone	11 – 13% of alpha acids
Storageability	Good
Total Oil	0.7 – 1.6 mls/100 grams
Myrcene	33 – 62% of whole oil
Humulene	24 – 36% of whole oil
Caryophyllene	6.5 – 10% of whole oil
Farnesene	<1% of whole oil
General Trade Perception	An excellent new variety with balanced bittering properties combined with a good aroma profile.
Possible Substitutions	Willamette, US Fuggle, US Tettnang, Styrian Golding
Typical Beer Styles	Pale Ale, ESB, Bitter, English-Style Pale Ale, Porter, Stout
Additional Information	Released as a public variety in 2000 by Dr. Stephen Kenny, Washington State University. It was chosen for its low cohumulone and good yield potential.

Personal Notes:



Hopunion CBS, LLC

US GOLDING

Pedigree	The genuine long-established East Kent Golding variety group imported from England. Started by Hopunion in the US in 1993.
Maturity	Early to mid-season
Yield	1000 - 1450 kg/ha or 900 - 1300 lbs./ac.
Growth Habit	Average
Disease/Pest Susceptibility	Sensitive to downy mildew and highly sensitive to Hop Mosaic Virus infection.
Pickability/Drying/Baling	Care needed in picking light fluffy cones. Requires adequate conditioning to prevent shatter.
Cone-Structure	Small, light and fluffy
Luplin	Palish yellow and only moderate amounts
Aroma	Mild, delicate classic English-type
Alpha Acids	4.0 – 5.0% w/w
Beta Acids	2.0 – 3.0% w/w
Co-Humulone	20 – 25% of alpha acids
Storageability	65 – 80% of alpha acids remaining after 6 months at 20°C
Total Oil	0.5 – 1.0 mls/100 grams
Myrcene	20 – 35% of whole oil
Humulene	35 – 45% of whole oil
Caryophyllene	10 – 15% of whole oil
Farnesene	<1% of whole oil
General Trade Perception	US Goldings are very popular among ale breweries in the US
Possible Substitutions	UK East Kent Golding, UK Progress and possibly the Fuggle family.
Typical Beer Styles	All English-style beers, especially all Bitters and Pale Ale, Belgian-Style Ales, Barley Wine
Additional Information	UK Golding clones have been introduced for growing here in Washington and Oregon. Before being grown in the US, there was a Golding grown in British Columbia (BC Golding), there are no longer any more BC Golding hops grown.

Personal Notes:



Hopunion CBS, LLC

US HALLERTAU

Pedigree	Traditional German variety, originally selected in the area of the same name.
Maturity	Early
Yield	900 – 1400 kg./ha. or 800 – 1250 lb./ac.
Growth Habit	Can be variable in production
Disease/Pest Susceptibility	Can display reaction to Prunus necrotic ring-spot virus infection. Fairly sensitive to downy mildew, Verticillium wilt and insects.
Pickability/Drying/Baling	Fair to good
Cone-Structure	Fairly loose, small and light
Lupulin	Moderate amount, quite pale
Aroma	Very mild, slightly flowery and somewhat spicy
Alpha Acids	3.5 – 5.5% w/w
Beta Acids	3.5 – 5.5% w/w
Co-Humulone	18 – 24% of alpha acids
Storageability	52 – 58% alpha acids remaining after 6 months storage at 20° C
Total Oil	0.6 – 1.0 mls/100 grams
Myrcene	35 – 44% of whole oil
Humulene	30 – 38% of whole oil
Caryophyllene	10 – 12% of whole oil
Farnesene	<1% of whole oil
General Trade Perception	Traditional German aroma hop
Possible Substitutions	Liberty, German Hallertau, German Tradition
Typical Beer Styles	Lager, Pilsner, Bock, Wheat, Kölsch, Munich Helles, Belgian-Style Ales
Additional Information	Limited acreage grown, though seeing increased popularity among craft-brewers. More expensive than the triploid Hallertau, Mt Hood & Liberty, which have better yield. Have seen, for example, Mt Hood sold as simply Hallertau. If you want Hallertau, make sure you are getting the real thing. If you're not sure, ask!

Personal Notes:



Hopunion CBS, LLC

US HORIZON

Pedigree	A diploid high alpha, low co-humulone selection. Cross made in Oregon in 1970, half-sister of Nugget.
Maturity	Medium
Yield	2100 - 2300 kg./ha. or 1900 – 2000 lb./ac.
Growth Habit	Moderately vigorous, neat even columnar habit
Disease/Pest Susceptibility	Susceptibility to downy mildew. Moderately resistant Verticillium wilt.
Pickability/Drying/Baling	Good
Cone-Structure	Firm, quite tight
Lupulin	Moderate amount, yellow
Aroma	Floral, spicy
Alpha Acids	11 – 13% w/w
Beta Acids	6.5 – 8.5% w/w
Co-Humulone	16 – 19% of alpha acids
Storageability	Average to good
Total Oil	1.5 – 2.0 mls/100 grams
Myrcene	55 – 65% of whole oil
Humulene	11 – 13% of whole oil
Caryophyllene	7.5 – 9% of whole oil
Farnesene	2.5 – 3.5% of whole oil
General Trade Perception	Good potential as a medium alpha, good aroma, dual purpose hop. Has a low co-humulone, which results in a clean tasting beer.
Possible Substitutions	Magnum
Typical Beer Styles	All Ales and Lagers
Additional Information	Commercially grown in small quantities. Gaining in popularity with the craft-brewing industry.
Personal Notes:	



Hopunion CBS, LLC

US LIBERTY

Pedigree	Cross between colchicines-induced tetraploid female hop cultivar Hallertauer Mittlefruh and downy mildew resistant male.
Maturity	Early to mid-season
Yield	1100 – 1900 kg./ha. or 1000 – 1700 lb./ac.
Growth Habit	Columnar and quite vigorous
Disease/Pest Susceptibility	Moderately resistant to downy mildew. No Verticillium wilt symptoms observed.
Pickability/Drying/Baling	Fair to good
Cone-Structure	Smallish plump, dense cones
Lupulin	Moderate amounts, dark yellow in color
Aroma	Mild with a slightly spicy character
Alpha Acids	3.0 – 5.0% w/w
Beta Acids	3.0 – 4.0% w/w
Co-Humulone	24 – 30% of alpha acids
Storageability	35 – 55% alpha acids remaining after 6 months storage at 20° C
Total Oil	0.6 – 1.2 mls/100 grams
Myrcene	20 – 40% of whole oil
Humulene	35 – 40% of whole oil
Caryophyllene	9 – 12% of whole oil
Farnesene	<1% of whole oil
General Trade Perception	Aroma variety with close similarities to imported German aroma varieties, especially Hallertau.
Possible Substitutions	US or German Hallertau, German Tradition, Mt Hood, possibly Spalt
Typical Beer Styles	Lager, Pilsner, Bock, US Wheat, Kölsch
Additional Information	Released in the US in 1991. Of the four triploid Hallertau varieties released, Liberty most closely resembles the Hallertau cultivar.
Personal Notes:	



Hopunion CBS, LLC

US MAGNUM

Pedigree	Bred at the Hop Research Institute in Hüll (Germany)
Maturity	Late
Yield	1900 – 2000 kg./ha. or 1340 – 1700 lb./ac.
Growth Habit	Good
Disease/Pest Susceptibility	Good resistance to wilt and downy mildew, susceptible to powdery mildew
Pickability/Drying/Baling	Below average
Cone-Structure	Large cone
Lupulin	Plentiful
Aroma	No real distinct aroma character, so is viewed favorably as a clean bittering hop
Alpha Acids	12 – 14% w/w
Beta Acids	4.5 – 6% w/w
Co-Humulone	24 – 28% of alpha acids
Storageability	Very good alpha acids remaining after 6 months storage at 20° C
Total Oil	1.9 – 2.3 mls/100 grams
Myrcene	30 – 35% of whole oil
Humulene	34 – 40% of whole oil
Caryophyllene	8 – 12% of whole oil
Farnesene	<1% of whole oil
General Trade Perception	Gaining increasing acceptance as a clean bittering hop.
Possible Substitutions	German Magnum, possibly Horizon
Typical Beer Styles	Good bittering hop for all Ales and Lagers
Additional Information	Limited acreage in the US, but widely grown in Germany.
Personal Notes:	



Hopunion CBS, LLC

US MILLENIUM

Pedigree	Millennium is a triploid, high alpha acids variety, with Nugget as the mother.
Maturity	Middle-Late
Yield	2750 – 2900 kg./ha. or 2400 – 2600 lb./ac.
Growth Habit	Vigorous
Disease/Pest Susceptibility	Appears fairly resistant to most diseases, including Powdery Mildew
Pickability/Drying/Baling	Good
Cone-Structure	Heavy, compact
Lupulin	Yellow
Aroma	Mild, Herbal, similar to Nugget
Alpha Acids	15.5% w/w
Beta Acids	4.8% w/w
Co-Humulone	30% of alpha acids
Storageability	24% alpha acids remaining after 6 months storage at 20° C
Total Oil	2.0 mls/100 grams
Myrcene	Great variation
Humulene	25% of whole oil
Caryophyllene	10.6% of whole oil
Farnesene	<1% of whole oil
General Trade Perception	Very new hop. Primarily used for alpha potential
Possible Substitutions	Nugget and Columbus
Typical Beer Styles	Ales, Stout, Barley Wine
Additional Information	Released by John I Haas
Personal Notes:	



Hopunion CBS, LLC

US MOUNT HOOD

Pedigree	A triploid seedling of the German Hallertauer variety
Maturity	Early to mid-season
Yield	1700 – 2200 kg./ha. or 1520 – 1960 lb./ac.
Growth Habit	Fairly vigorous but manageable
Disease/Pest Susceptibility	Moderately resistant to downy mildew
Pickability/Drying/Baling	Good
Cone-Structure	Medium-size and fairly compact
Lupulin	Moderate amount, yellow in color
Aroma	Mild, somewhat pungent
Alpha Acids	5.0 – 8.0% w/w
Beta Acids	5.0 – 7.5% w/w
Co-Humulone	22 – 23% of alpha acids
Storageability	50 -60% alpha acid remaining after 6 months storage at 20° C
Total Oil	1.0 – 1.3 mls/100 grams
Myrcene	55 – 65% of whole oil
Humulene	15 – 25% of whole oil
Caryophyllene	7 – 10% of whole oil
Farnesene	<1% of whole oil
General Trade Perception	Aroma variety with marked similarities to the German Hallertauer and Hersbrucker varieties. Most popular hop in the triploid Hallertau breeding program, partly due to the fact it was the first one released.
Possible Substitutions	Crystal, French Strisselspalt, Hersbrucker
Typical Beer Styles	Lager, Pilsner, Bock, US Wheat, Alt, Munich Helles
Additional Information	Released in the US in 1989.
Personal Notes:	



Hopunion CBS, LLC

US NEWPORT

Pedigree	Open pollination
Maturity	Moderately late
Yield	2300 – 2840 kg/ha. or 1990 – 2550 lb./ac.
Growth Habit	Good
Disease/Pest Susceptibility	Resistance to both powdery and downy mildew.
Pickability/Drying/Baling	Good
Cone-Structure	Medium-large, somewhat loose
Lupulin	Moderate, Yellow in color
Aroma	Mild
Alpha Acids	13.5 – 17% w/w
Beta Acids	7.2 – 9.1% w/w
Co-Humulone	36 – 38% of alpha acids
Storageability	60% alpha acids remaining after 6 months storage at 20° C
Total Oil	1.6 – 3.36 mls/100 grams
Myrcene	47 – 54% of whole oil
Humulene	9 – 14% of whole oil
Caryophyllene	4.5 – 7% of whole oil
Farnesene	<1% of whole oil
General Trade Perception	Viewed as a high-bittering alpha hop.
Possible Substitutions	Galena, Nugget, Fuggle, Magnum, Brewer's Gold
Typical Beer Styles	Ales, Stout, Barley Wine
Additional Information	One of the newest varieties to be released in the US (Year 2002)
Personal Notes:	



Hopunion CBS, LLC

US NORTHERN BREWER

Pedigree	Bred in England in 1934 from a cross between a female hop of wild American parentage and an English male.
Maturity	Early to mid-season
Yield	1200 – 1600 kg./ha. or 1000 – 1400 lb./ac.
Growth Habit	Adequate in temperate climates but has difficulty growing when under heat stress.
Disease/Pest Susceptibility	Susceptible to downy mildew, no strong virus reactions. Has resistance to aphids and mites.
Pickability/Drying/Baling	Good
Cone-Structure	Medium-sized cone, only fairly tight. Prone to develop leaves in cones, also called “cock hops.”
Lupulin	Medium yellow. Fairly abundant
Aroma	Medium -strong
Alpha Acids	8 – 10% w/w
Beta Acids	3 – 5% w/w
Co-Humulone	20 – 30 % of alpha acids
Storageability	70 – 85% alpha acids remaining after 6 months storage at 20° C
Total Oil	1.5 – 2.0 mls/100 grams
Myrcene	50 – 60% of whole oil
Humulene	20 – 30 % of whole oil
Caryophyllene	5 – 10% of whole oil
Farnesene	<1% of whole oil
General Trade Perception	A true dual-purpose hop, containing moderate amounts of alpha acids combined with a good aroma profile.
Possible Substitutions	German Northern Brewer, Chinook
Typical Beer Styles	All English-styles, especially Porter, American Ales, Kölsch, Munich Helles
Additional Information	A major alpha hop in Germany, but declining in areas in England. Limited acreage in the US.
Personal Notes:	



Hopunion CBS, LLC

US NUGGET

Pedigree	Selected from a cross between Brewer's Gold and a high alpha acids male with good storage properties.
Maturity	Mid-season
Yield	1900 – 2500 kg./ha. or 1700 – 2230 lb./ac.
Growth Habit	Good
Disease/Pest Susceptibility	Little visual reaction to infection with Prunus necrotic ring-spot virus. Moderate to good resistance to downy mildew, but susceptible to spider mites.
Pickability/Drying/Baling	Very good
Cone-Structure	Heavy, tight and moderately long
Lupulin	Plentiful and yellow-orange in color
Aroma	Herbal
Alpha Acids	12 – 14% w/w
Beta Acids	4 – 6% w/w
Co-Humulone	24 – 30% of alpha acids
Storageability	70 – 80% alpha acids remaining after 6 months storage at 20° C
Total Oil	1.7 – 2.3 mls/100 grams
Myrcene	51 – 59% of whole oil
Humulene	12 – 22% of whole oil
Caryophyllene	7 – 10% of whole oil
Farnesene	<1% of whole oil
General Trade Perception	A high alpha acids hop with a good aroma profile.
Possible Substitutions	Galena, Magnum, Columbus, Wye Target
Typical Beer Styles	Ales, Stout, Barley Wine
Additional Information	Released in 1982 and now a major high alpha acids variety in the US. Also grown in Germany.
Personal Notes:	



Hopunion CBS, LLC

US PERLE

Pedigree	Bred in Germany from the English Northern Brewer variety.
Maturity	Early
Yield	1300 – 1800 kg./ha. or 1160 – 1600 lb./ac.
Growth Habit	Good – Does not like hot weather
Disease/Pest Susceptibility	Mainly tolerant to Prunus necrotic ring-spot virus infection. Fairly resistant to downy mildew.
Pickability/Drying/Baling	Good
Cone-Structure	Fairly loose, medium-long
Lupulin	Plentiful, fairly dark yellow
Aroma	Floral and slightly spicy
Alpha Acids	7 – 9.5% w/w
Beta Acids	4 – 5% w/w
Co-Humulone	27 – 32% of alpha acids
Storageability	80 – 85% alpha acids remaining after 6 months storage at 20° C
Total Oil	0.7 – 0.9 mls/100 grams
Myrcene	45 – 55% of whole oil
Humulene	28 – 33% of whole oil
Caryophyllene	10 -12% of whole oil
Farnesene	<1% of whole oil
General Trade Perception	A hop with German type aroma properties combines with moderate bittering potential. A dual purpose hop. Popular with craft-brewers.
Possible Substitutions	German Perle, German and US Northern Brewer
Typical Beer Styles	Pale Ale, Porter, Stout, Lager, Weizen, Alt, Barley Wine, Kölsch
Additional Information	Excellent storagability.
Personal Notes:	



Hopunion CBS, LLC

US SAAZ

Pedigree	US equivalent of the Czech variety of the same name/
Maturity	Early
Yield	650 – 1150 kg./ha. or 600 – 1000 lb./ac.
Growth Habit	Difficult hop to grow. Yields can vary greatly from year to year.
Disease/Pest Susceptibility	Some tolerance to downy mildew but prone to virus symptoms under certain conditions.
Pickability/Drying/Baling	Good, tend to shatter if over-ripe.
Cone-Structure	Small, light, fluffy cone
Lupulin	Limited amount, pale yellow
Aroma	Very mild, spicy and earthy
Alpha Acids	3.0 – 4.5% w/w
Beta Acids	3.0 – 4.5% w/w
Co-Humulone	24 – 28% of alpha acids
Storageability	45 – 55% alpha acids remaining after 6 months storage at 20° C
Total Oil	0.5 – 1.0 mls/100 grams
Myrcene	25 – 30% of whole oil
Humulene	35 – 40% of whole oil
Caryophyllene	9 – 11% of whole oil
Farnesene	9 – 13% of whole oil
General Trade Perception	Available in small quantities.
Possible Substitutions	Czech Saaz, Polish Lublin, Sterling
Typical Beer Styles	Pilsner, Lager, US Wheat, Belgian-Style Ales, Bitter
Additional Information	High ambient temperatures can have an adverse effect on yields.
Personal Notes:	



Hopunion CBS, LLC

US SANTIAM

Pedigree	Triploid aroma selection using a diploid Tettngang clone and a tetraploid Hallertauer. Released in 1997.
Maturity	Medium
Yield	1600 – 2350 kg./ha. or 1400 – 2100 lb./ac.
Growth Habit	Very good
Disease/Pest Susceptibility	Resistant to downy mildew
Pickability/Drying/Baling	Good
Cone-Structure	Small, medium density
Lupulin	Moderate amount
Aroma	Floral, slightly spicy
Alpha Acids	5 – 7% w/w
Beta Acids	6 – 8% w/w
Co-Humulone	22 – 24% of alpha acids
Storageability	Average
Total Oil	1.3 – 1.5 mls/100 grams
Myrcene	27 – 36% of whole oil
Humulene	23 – 26% of whole oil
Caryophyllene	7 – 8% of whole oil
Farnesene	13 – 16% of whole oil
General Trade Perception	A newly developed American aroma hop that contains noble hop characteristics.
Possible Substitutions	German Tettngang, German Spalt, German Spalter Select
Typical Beer Styles	Lager, US Ales, Pilsner, Belgian Tripel and other Belgian-Styles, Kölsch, Bock, Munich Helles
Additional Information	Limited but stable acreage.
Personal Notes:	



Hopunion CBS, LLC

US SIMCOE™

Pedigree	Released in 2000
Maturity	Medium
Yield	2650 – 2880 kg./ha. or 2300 – 2500 lb./ac.
Growth Habit	Not overly vigorous
Disease/Pest Susceptibility	Moderate tolerance to powdery mildew, Spaerotheca.
Pickability/Drying/Baling	Good
Cone-Structure	Medium-size
Lupulin	Bright yellow
Aroma	Very unique, pine-like aroma
Alpha Acids	12 – 14% w/w
Beta Acids	4 – 5% w/w
Co-Humulone	15 – 20% of alpha acids
Storageability	Good
Total Oil	2 – 2.5 mls/100 grams
Myrcene	60 -65% of whole oil
Humulene	10 – 15% of whole oil
Caryophyllene	5 – 8% of whole oil
Farnesene	<1% of whole oil
General Trade Perception	Used for aromatic, and especially bittering properties
Possible Substitutions	Unknown
Typical Beer Styles	American Ales
Additional Information	Known as a bittering hop with good aroma characteristics

Personal Notes:



Hopunion CBS, LLC

US STERLING

Pedigree	Released in 1998
Maturity	Medium
Yield	2020 – 2245 kg./ha. or 1800 – 2000 lb./ac.
Growth Habit	Moderately vigorous
Disease/Pest Susceptibility	Moderately resistant to downy mildew
Pickability/Drying/Baling	Good
Cone-Structure	Medium
Lupulin	Pale yellow
Aroma	Herbal, spicy with a hint of floral and citrus
Alpha Acids	6 – 9% w/w
Beta Acids	4 – 6% w/w
Co-Humulone	22 – 28% of alpha acids
Storageability	Good alpha acids remaining after 6 months storage at 20° C
Total Oil	1.3 – 1.9 mls/100 grams
Myrcene	44 – 48% of whole oil
Humulene	19 – 23% of whole oil
Caryophyllene	5 – 7% of whole oil
Farnesene	11 – 17% of whole oil
General Trade Perception	Perceived to be similar to a Saaz and Mt Hood combination. Finding favor as a Saaz replacement.
Possible Substitutions	Czech Saaz
Typical Beer Styles	Pilsner and other Lagers, Ales and Belgian-Style Ales
Additional Information	Limited, but stable acreage.
Personal Notes:	



Hopunion CBS, LLC

US TETTNANG

Pedigree	Commercially grown in the US since the 1980's.
Maturity	Early
Yield	1000 – 1500 kg./ha. or 900 – 1340 lb./ac.
Growth Habit	Fairly neat
Disease/Pest Susceptibility	Can display reaction to Prunus necrotic ring-spot virus infection. Moderately resistant to downy mildew. Sensitive to insects, in particular mites.
Pickability/Drying/Baling	Fair to good
Cone-Structure	Medium-compact, fairly small light cone
Lupulin	Moderate amount, pale yellow
Aroma	Slightly spicy
Alpha Acids	4.0 – 5.0% w/w
Beta Acids	3.0 – 4.0% w/w
Co-Humulone	20 -25% of alpha acids
Storageability	55 – 60% of alpha acids remaining after 6 months storage at 20° C
Total Oil	0.4 – 0.8 mls/100 grams
Myrcene	36 – 45% of whole oil
Humulene	18 – 23% of whole oil
Caryophyllene	6 – 7% of whole oil
Farnesene	5 – 8% of whole oil
General Trade Perception	A true noble aroma variety
Possible Substitutions	German Spalt Select, German Spalt, Santiam
Typical Beer Styles	Lager, US Ales, Pilsner, US Wheat, Bitter
Additional Information	US Tettnang is similar to Fuggie. A very popular hop with the craft-brewery industry.
Personal Notes:	



Hopunion CBS, LLC

US VANGUARD

Pedigree	From a cross made in 1982 between USDA accessions 21285 (a Hallertau mf daughter) and 64037M.
Maturity	Early
Yield	1500 – 1650 kg./ha. or 1350 – 1475 lb./ac.
Growth Habit	Columnar. Good spring growth. The shoots are upright and easy to train. The shoots are light yellow and turn green as they climb the string.
Disease/Pest Susceptibility	Resistance to hop downy mildew similar to that of the cultivars Nugget and Willamette
Pickability/Drying/Baling	Good
Cone-Structure	Small to medium-sized, fairly light.
Lupulin	Light yellow
Aroma	Similar to Hallertau.
Alpha Acids	5.5% - 6% w/w
Beta Acids	6 – 7% w/w
Co-Humulone	14 – 16% of alpha acids
Storageability	75 – 80% alpha acids remaining after 6 months storage at 20° C
Total Oil	.9 – 1.2 mls/100 grams
Myrcene	20 – 25% of whole oil
Humulene	45 – 50% of whole oil
Caryophyllene	12 – 14% of whole oil
Farnesene	<1% of whole oil
General Trade Perception	Still being tested and looked at by micro & craft breweries.
Possible Substitutions	Hallertau, German Hersbrucker, Mt Hood, Liberty
Typical Beer Styles	Lager, Pilsner, Bock, Kölsch, Wheat, Munich Helles, Belgian-Style Ales
Additional Information	Similar to Hallertau Mittlefruh
Personal Notes:	



Hopunion CBS, LLC

US WARRIOR™

Pedigree	Unknown
Maturity	Medium
Yield	2750 – 3000 kg./ha. 2400 – 2600 lb./ac.
Growth Habit	Vigorous
Disease/Pest Susceptibility	Moderate tolerance to powdery mildew, Spaerotheca.
Pickability/Drying/Baling	Good
Cone-Structure	Medium-sized
Lupulin	Bright yellow
Aroma	Very mild
Alpha Acids	15 – 17% w/w
Beta Acids	4.5 – 5.5% w/w
Co-Humulone	24 - ???% of alpha acids
Storageability	Good
Total Oil	1.0 – 2.0 mls/100 grams
Myrcene	40 – 50% of whole oil
Humulene	15 – 20% of whole oil
Caryophyllene	8 – 10% of whole oil
Farnesene	<1% of whole oil
General Trade Perception	New hop with much potential. Very stable.
Possible Substitutions	Nugget, Columbus
Typical Beer Styles	Pale Ale, IPA
Additional Information	Very grower friendly
Personal Notes:	



Hopunion CBS, LLC

US WILLAMETTE

Pedigree	A triploid seedling of the English Fuggle variety.
Maturity	Early to mid-season
Yield	1500 – 1900 kg./ha. or 1340 – 1700 lb./ac.
Growth Habit	Good, vigorous but manageable
Disease/Pest Susceptibility	No visible reaction to Prunus necrotic ring-spot virus. Fair resistance to downy mildew. Susceptible to Verticillium wilt. Some susceptibility to powdery mildew.
Pickability/Drying/Baling	Good
Cone-Structure	Small to medium sized, round, and fairly light
Lupulin	Moderate amount, golden yellow in color
Aroma	Mild and pleasant, slightly spicy
Alpha Acids	4.0 – 6.0% w/w
Beta Acids	3.0 – 4.0% w/w
Co-Humulone	30 -35% of alpha acids
Storageability	60 – 65% alpha acids remaining after 6 months storage at 20° C
Total Oil	1.0 – 1.5% mls/100 grams
Myrcene	45 – 55% of whole oil
Humulene	20 – 30% of whole oil
Caryophyllene	7 – 8% of whole oil
Farnesene	5 – 6% of whole oil
General Trade Perception	A quality aroma hop
Possible Substitutions	US Fuggle, US Tettnang, Styrian Golding
Typical Beer Styles	All English-style Ales, and US Pale and Brown Ales.
Additional Information	Released in 1976 and well-established in the US industry. Currently the most widely grown aroma hops in the US.

Personal Notes:



Hopunion CBS, LLC

CZECH SAAZ

Pedigree	Czech aroma landrace variety selected in the area of the same name.
Maturity	Various maturities in different clonal selections
Yield	900 – 1500 kg./ha. Or 800 – 1350 lb./ac.
Growth Habit	Some clones quite vigorous, others weak
Disease/Pest Susceptibility	Susceptible to downy and powdery mildew. Not tolerant to hop wilt. Shows increased productivity when freed of viruses.
Pickability/Drying/Baling	Tendency to cone shatter if handled roughly
Cone-Structure	Smallish, light cone
Lupulin	Not abundant, pale yellow color
Aroma	Very mild with pleasant hoppy notes
Alpha Acids	3 – 4.5% w/w
Beta Acids	3 – 4.5% w/w
Co-Humulone	24 – 28% of alpha acids
Storageability	45 – 55% alpha acids remaining after 6 months storage at 20° C
Total Oil	0.4 – 0.7 mls/100 grams
Myrcene	20 – 25% of whole oil
Humulene	40 – 45% of whole oil
Caryophyllene	10 – 12% of whole oil
Farnesene	11 – 15% of whole oil
General Trade Perception	The classical “noble” aroma hop with long and strong traditions. Associated with the renowned Pilsner lager.
Possible Substitutions	US Saaz, Polish Lublin, US Sterling
Typical Beer Styles	Pilsner, Lagers, Belgian-Style Ales, Lambic, sometimes Bitter
Additional Information	By far the predominant Czech variety and clones of it are grown in Poland and the Ukraine.
Personal Notes:	



Hopunion CBS, LLC

FRENCH STRISSELSPALT

Pedigree	Major aroma hops of the Alsace area of France near Strasbourg.
Maturity	Late
Yield	1500 – 2000 kg./ha. or 1350 – 1800 lb./ac.
Growth Habit	Quite vigorous and moderately prolific cone producer
Disease/Pest Susceptibility	Susceptible to English and French wilt strains. Not resistant to downy mildew or powdery mildews.
Pickability/Drying/Baling	Good
Cone-Structure	Plumpish, medium-sized cone with fairly tight strig
Lupulin	Quite dark yellow, moderately abundant
Aroma	Medium intensity, pleasant and hoppy
Alpha Acids	3 – 5% w/w
Beta Acids	3 – 5.5% w/w
Co-Humulone	20 – 25% of alpha acids
Storageability	60 – 70% alpha acids remaining after 6 months storage at 20° C
Total Oil	0.6 – 0.9 mls/100 grams
Myrcene	20 – 30% of whole oil
Humulene	15 – 25% of whole oil
Caryophyllene	8 – 10% of whole oil
Farnesene	<1% of whole oil
General Trade Perception	Good to very good aroma hop
Possible Substitutions	Mt Hood, Crystal, Hersbruck
Typical Beer Styles	Pilsner, Lager, Wheat
Additional Information	Well accepted as good aroma hop around the world. Similar to Hersbruck in profile but preferred by some breweries.
Personal Notes:	



Hopunion CBS, LLC

GR BREWER'S GOLD

Pedigree	Released in 1934
Maturity	Late
Yield	2150 – 2350 kg./ha. or 1950 – 2100 lb./ac.
Growth Habit	Vigorous
Disease/Pest Susceptibility	Low resistance to wilt and powdery mildew
Pickability/Drying/Baling	Good
Cone-Structure	Small and tight
Lupulin	Full
Aroma	Black currant, fruity, spicy
Alpha Acids	5.5 – 6.5% w/w
Beta Acids	2.5 – 3.5% w/w
Co-Humulone	40 – 48% of alpha acids
Storageability	Average
Total Oil	1.8 – 2.2 mls/100 grams
Myrcene	37 – 40% of whole oil
Humulene	29 – 31% of whole oil
Caryophyllene	7 – 7.5% of whole oil
Farnesene	<1% of whole oil
General Trade Perception	Mainly used as a bittering hop
Possible Substitutions	UK Northdown, Northern Brewer, Galena, Bullion, US Brewer's Gold
Typical Beer Styles	Ale, heavier German style Lagers, Lambic
Additional Information	Originally bred in the UK by Professor E.S. Salmon
Personal Notes:	



Hopunion CBS, LLC

GR HALLERTAU

Pedigree	At one time the major Hallertau landrace variety with a highly acclaimed aroma profile.
Maturity	Early to mid-season
Yield	1300 – 1800 kg./ha. or 1150 – 1600 lb./ac.
Growth Habit	Moderately vigorous on most soil types
Disease/Pest Susceptibility	Sensitive to German wilt which resulted in reduction of its acreage and replacement by Hersbrucker over the 1970's and 1980's.
Pickability/Drying/Baling	Good
Cone-Structure	Lightish, fluffy cone
Lupulin	Pale to medium yellow in color
Aroma	Mild and pleasant
Alpha Acids	3.5 – 5.5% w/w
Beta Acids	3 – 4% w/w
Co-Humulone	17 – 24% of alpha acids
Storageability	50 – 60% alpha acids remaining after 6 months storage at 20° C
Total Oil	0.7 – 1.3 mls/100 grams
Myrcene	10 – 20% of whole oil
Humulene	30 – 35% of whole oil
Caryophyllene	7 – 10% of whole oil
Farnesene	<1% of whole oil
General Trade Perception	The classic German aroma hop associated with Bavarian style lager beers.
Possible Substitutions	Liberty, German Tradition, Ultra
Typical Beer Styles	Lager, Bock, Pilsner, Weizen, Belgian-Style Ales, Alt, Lambic, Kölsch, Munich Ales
Additional Information	Limited areas grown in the US, tends to grow best in the milder climates of Oregon and northern Idaho.
Personal Notes:	



Hopunion CBS, LLC

GR HERSBRUCKER

Pedigree	Traditional German landrace variety selected in the Hersbruck area.
Maturity	Late
Yield	1600 – 2000 kg./ha. or 1400 – 1800 lb./ac.
Growth Habit	Quite vigorous and croppy
Disease/Pest Susceptibility	Fair to good resistance to German strains of Verticillium wilt. No resistance to downy mildew.
Pickability/Drying/Baling	Good
Cone-Structure	Plump, round, medium-sized cone and quite light
Lupulin	Moderate amount, dark yellow in color
Aroma	Mild to semi-strong, pleasant and hoppy
Alpha Acids	3 – 5.5% w/w
Beta Acids	4 – 5.5% w/w
Co-Humulone	19 – 25% of alpha acids
Storageability	55 – 65% alpha acids remaining after 6 months storage at 20° C
Total Oil	0.7 – 1.3 mls/100 grams
Myrcene	15 – 25% of whole oil
Humulene	15 – 25% of whole oil
Caryophyllene	7 – 12% of whole oil
Farnesene	<1% of whole oil
General Trade Perception	Good to very good aroma hop.
Possible Substitutions	Mt Hood, French Strisselspalt
Typical Beer Styles	Lager, Pilsner, Bock, Weizen Bock, Wheat, Belgian-Style Ales, Kölsch, Munich Helles
Additional Information	Grown widely not only in the Hallertau but also in Spalt and Hersbruck areas.
Personal Notes:	



Hopunion CBS, LLC

GR MAGNUM

Pedigree	Bred at the Hop Research Institute in Hüll (Germany)
Maturity	Late
Yield	1900 – 2100 kg./ha. or 1340 – 1700 lb./ac.
Growth Habit	Average
Disease/Pest Susceptibility	Good resistance to wilt and peronospora, low resistance to powdery mildew
Pickability/Drying/Baling	Good
Cone-Structure	Large cone
Lupulin	Plentiful
Aroma	No real distinct aroma character, so is viewed favorably as a clean bittering hop
Alpha Acids	12 – 14% w/w
Beta Acids	4.5 – 5% w/w
Co-Humulone	24 – 25% of alpha acids
Storageability	Very good
Total Oil	1.9 – 2.3 mls/100 grams
Myrcene	30 – 35% of whole oil
Humulene	34 – 40% of whole oil
Caryophyllene	8 – 12% of whole oil
Farnesene	<1% of whole oil
General Trade Perception	This high-alpha variety is a very promising new breed from the Hop Research Institution in Hüll with good resistance characteristics, high yield and good growth.
Possible Substitutions	Columbus, Nugget
Typical Beer Styles	Lagers, Pilsner types, Stout, Ales. Typically base bitterness in Lager beers (commonly used as a first hop addition) and at the same time, used by many ale brewers too.
Additional Information	Hallertau Magnum is the second largest hop variety and the main high alpha variety grown in Germany.
Personal Notes:	



Hopunion CBS, LLC

GR NORTHERN BREWER

Pedigree	One of the original medium to high alpha hops, bred in England and later grown also in Belgium, Spain, Germany and the US.
Maturity	Early – Mid season
Yield	1800 – 2400 kg./ha. or 1600 – 2150 lb./ac.
Growth Habit	Quite vigorous and strong growing
Disease/Pest Susceptibility	Susceptible to downy and powdery mildew but tolerant to German hop wilt. No strong virus reactions.
Pickability/Drying/Baling	Good
Cone-Structure	Medium-sized cone, only fairly compact. Variety prone to produce leaves in cones – “cock hops”
Lupulin	Medium yellow, fairly abundant
Aroma	Medium-strong with some wild American tones
Alpha Acids	7 – 10% w/w
Beta Acids	3.5 – 5% w/w
Co-Humulone	28 – 33% of alpha acids
Storageability	70 – 80% alpha acids remaining after 6 months storage at 20° C
Total Oil	1.6 – 2.1 mls/100 grams
Myrcene	30 – 35% of whole oil
Humulene	25 – 30% of whole oil
Caryophyllene	8 – 10% of whole oil
Farnesene	<1% of whole oil
General Trade Perception	A true dual-purpose hop containing moderate amounts of alpha acids combined with an acceptable aroma profile.
Possible Substitutions	Chinook, US Northern Brewer, German Brewer’s Gold
Typical Beer Styles	ESB, Bitter, English Pale Ale, Porter, Lager, Lambic, Munich Helles
Additional Information	Although declining in area in England, this variety is one of the main high-alpha hops in Germany.
Personal Notes:	



Hopunion CBS, LLC

GR PERLE

Pedigree	Bred at the Hüll Hop Research Institute from the English Northern Brewer variety.
Maturity	Mid-season to late
Yield	1750 – 2200 kg./ha. or 1550 – 1950 lb./ac.
Growth Habit	Moderately vigorous and easy to grow
Disease/Pest Susceptibility	Good tolerance to German wilt and downy mildew
Pickability/Drying/Baling	Good
Cone-Structure	Smallish, plump but quite tight cone
Lupulin	Quite copious and fairly dark in color
Aroma	Moderately intense, good and hoppy
Alpha Acids	6 – 8% w/w
Beta Acids	3.5 – 5.5% w/w
Co-Humulone	25 – 32% of alpha acids
Storageability	70 -80% alpha acids remaining after 6 months storage at 20° C
Total Oil	0.8 – 1.3 mls/100 grams
Myrcene	10 – 20% of whole oil
Humulene	30 – 36% of whole oil
Caryophyllene	8 – 10% of whole oil
Farnesene	<1% of whole oil
General Trade Perception	A well accepted dual-purpose hop with a good combination balanced bittering and highly acceptable aroma properties
Possible Substitutions	US Perle, Northern Brewer
Typical Beer Styles	Pale Ale, Porter, Stout, Lager, Pilsner, Weizen, Ale, Alt, Kölsch, Munich Helles
Additional Information	Introduced in the 1980's and grown in both Washington and Oregon states. Perle is the most popular German-grown hop variety.
Personal Notes:	



Hopunion CBS, LLC

GR SELECT

Pedigree	Bred from Hallertauer Mittelfrüh and Spalt as a disease resistant Spalt type. Originated from Hüll Research Institution.
Maturity	Medium late
Yield	1850 – 2100 kg./ha. or 1650 – 1875 lb./ac.
Growth Habit	Vigorous grower with large head of long laterals
Disease/Pest Susceptibility	Resistant to both Verticillium wilt and downy mildew
Pickability/Drying/Baling	Difficult if over vigorous
Cone-Structure	Smallish tight and quite dark cone
Lupulin	Moderate amounts, mid to deep yellow in color
Aroma	Very fine Spalter type aroma
Alpha Acids	4 – 6% w/w
Beta Acids	3.5 – 4.5% w/w
Co-Humulone	21 – 25% of alpha acids
Storageability	Good
Total Oil	0.5 – 1.0 mls/100 grams
Myrcene	15 – 25% of whole oil
Humulene	15 – 25% of whole oil
Caryophyllene	7 – 11% of whole oil
Farnesene	15 – 25% of whole oil
General Trade Perception	Too early for general consensus but bred to be like the Spalt/Tettnang/Saaz group
Possible Substitutions	US Saaz, US Tettnang, German Spalt, German Tettnang, German Hersbrucker
Typical Beer Styles	Lager, any beer where noble aroma is wanted (i.e. Pilsner)
Additional Information	Released in 1991 and seeing some limited expansion in German growing areas.
Personal Notes:	



Hopunion CBS, LLC

GR SPALT

Pedigree	Traditional German landrace variety selected and grown in the area of the same name.
Maturity	Medium - early
Yield	1200 – 1600 kg./ha or 1000 – 1400 lb./ac.
Growth Habit	Vigorous with long laterals but not prolific cone producer.
Disease/Pest Susceptibility	Field resistance to German strains of <i>Verticillium</i> wilt and some tolerance to downy mildew
Pickability/Drying/Baling	Fair to good but light cones
Cone-Structure	Smallish but fairly tight cone
Lupulin	Fair amount pale yellow in color
Aroma	Mild and pleasant, slightly spicy
Alpha Acids	4 – 5% w/w
Beta Acids	4 – 5% w/w
Co-Humulone	23 – 28% of alpha acids
Storageability	50 – 60% alpha acids remaining after 6 months storage at 20° C
Total Oil	0.5 – 1.1 mls/100 grams
Myrcene	15 – 25% of whole oil
Humulene	18 – 25% of whole oil
Caryophyllene	10 -15% of whole oil
Farnesene	10 -15% of whole oil
General Trade Perception	Traditional, very fine or noble aroma hop
Possible Substitutions	US Saaz, US Tettnang, German Spalt Select
Typical Beer Styles	Lager, Pilsner, Bock, Alt, Kölsch, Munich Helles
Additional Information	Grown only in Spalt area and not a large acreage available.
Personal Notes:	



Hopunion CBS, LLC

GR TETTANG

Pedigree	Traditional German variety developed in the area of the same name.
Maturity	Medium - early
Yield	1200 – 1600 kg./ha. or 1000 – 1400 lb./ac.
Growth Habit	Moderately vigorous but not prolific cone producer
Disease/Pest Susceptibility	Not resistant to German wilt strains. Some tolerance to downy mildew
Pickability/Drying/Baling	Good
Cone-Structure	Medium-sized fairly tight cone
Lupulin	Moderate amount, golden yellow
Aroma	Mild and pleasant, slightly spicy
Alpha Acids	3.5 – 5.5% w/w
Beta Acids	3.5 – 5% w/w
Co-Humulone	23 – 29% of alpha acids
Storageability	55 – 60% alpha acids remaining after 6 months storage at 20° C
Total Oil	0.6 – 1.0 mls/100 grams
Myrcene	20 – 25% of whole oil
Humulene	20 – 25% of whole oil
Caryophyllene	6 – 10% of whole oil
Farnesene	12 – 16% of whole oil
General Trade Perception	Traditional, very fine or noble aroma hop
Possible Substitutions	German Spalt, German Select, US Tettang, US Saaz, German Hersbrucker
Typical Beer Styles	Lager, Ale, Pilsner, Weizen, Lambic, Alt, Kölsch, Munich Helles
Additional Information	Largely confined to the Tettang area near Lake Constance.
Personal Notes:	



Hopunion CBS, LLC

GR TRADITION

Pedigree	A close descendent of Hallertau Mittlefrüh, bred for disease resistance at the Hüll Hop Research Institute in Germany.
Maturity	Medium early
Yield	1750 – 2000 kg./ha. or 1560 – 1780 lb./ac.
Growth Habit	Vigorous grower with long laterals
Disease/Pest Susceptibility	Resistant to both Verticillium wilt and downy mildew.
Pickability/Drying/Baling	Good
Cone-Structure	Medium-sized, quite tight cone
Lupulin	Moderate amount, pale yellow
Aroma	Very fine, similar to German Hallertau
Alpha Acids	5 – 7% w/w
Beta Acids	4 – 5% w/w
Co-Humulone	26 – 29% of alpha acids
Storageability	Good alpha acids remaining after 6 months storage at 20° C
Total Oil	1.0 – 1.4 mls/100 grams
Myrcene	20 – 25% of whole oil
Humulene	45 – 55% of whole oil
Caryophyllene	10 – 15% of whole oil
Farnesene	<1% of whole oil
General Trade Perception	Only recently released so too early for general consensus. Brew to replace Hersbrucker in German grown areas.
Possible Substitutions	Liberty, German Hallertau
Typical Beer Styles	Lager, Pilsner, Bock, Wheat, Weizen
Additional Information	Released in 1991 and undergoing expansion in German growing areas.
Personal Notes:	



Hopunion CBS, LLC

NZ ORGANIC HALLERTAU

Pedigree	Triploid bred from Hallertau Mittlefrüh
Maturity	Early season
Yield	2650 kgs./ha. or 2336 lb./ac.
Growth Habit	Fairly vigorous
Disease/Pest Susceptibility	No real disease problems
Pickability/Drying/Baling	Normal
Cone-Structure	Dense cluster
Lupulin	Plentiful
Aroma	Nice resiny, citrusy characteristic
Alpha Acids	7 – 9% w/w
Beta Acids	6 – 6.5% w/w
Co-Humulone	35% of alpha acids
Storageability	Very good
Total Oil	0.9 – 1.1 mls/100 grams
Myrcene	45 – 48% of whole oil
Humulene	10 – 12% of whole oil
Caryophyllene	6% of whole oil
Farnesene	5% of whole oil
General Trade Perception	Commonly used for aroma variety.
Possible Substitutions	Unknown
Typical Beer Styles	Mainly used for organic beers
Additional Information	Available in limited quantities. New crop availability in March.
Personal Notes:	



Hopunion CBS, LLC

NZ ORGANIC PACIFIC GEM

Pedigree	A triploid, high alpha variety released in 1987
Maturity	Early/Mid Season
Yield	2700 kg./ha. or 2380 lb./ac.
Growth Habit	Fairly vigorous
Disease/Pest Susceptibility	No real disease problems
Pickability/Drying/Baling	Normal
Cone-Structure	Medium-dense clusters
Lupulin	Plentiful
Aroma	Pleasant, blackberry aroma
Alpha Acids	14 – 16% w/w
Beta Acids	8 – 8.4% w/w
Co-Humulone	39% of alpha acids
Storageability	Very good
Total Oil	1.4% mls/100 grams
Myrcene	55% of whole oil
Humulene	18% of whole oil
Caryophyllene	7% of whole oil
Farnesene	<1% of whole oil
General Trade Perception	Widely used as a bittering hop. Woody flavor.
Possible Substitutions	Unknown
Typical Beer Styles	Organic Beers
Additional Information	Starting to see some limited use in the US. Considered to have some good future potential.
Personal Notes:	



Hopunion CBS, LLC

AU PRIDE OF RINGWOOD

Pedigree	Second generation from the English-Pride of Kent. Bred in Australia.
Maturity	Mid-season – late variety
Yield	2200 – 2800 kg./ha. or 1950 – 2500 lb./ac.
Growth Habit	Good vigor, well hopped, and a nice grower-friendly hop
Disease/Pest Susceptibility	Downy mildew, powdery mildew, and aphids are absent from Australia, so its susceptibility to these is immaterial
Pickability/Drying/Baling	Excellent
Cone-Structure	Fairly long, quite tight cone
Lupulin	Moderate to large amount, medium dark yellow
Aroma	Quite pronounced but not unpleasant
Alpha Acids	7 – 10% w/w
Beta Acids	4 – 6% w/w
Co-Humulone	33 – 39% of alpha acids
Storageability	45 – 55% alpha acids remaining after 6 months storage at 20° C
Total Oil	1.0 – 2.0 mls/100 grams
Myrcene	25 – 50% of whole oil
Humulene	3 – 8% of whole oil
Caryophyllene	5 – 10% of whole oil
Farnesene	<1% of whole oil
General Trade Perception	Predominantly a bittering hop but with interesting aromatic qualities
Possible Substitutions	Galena, Cluster
Typical Beer Styles	Australian Lagers
Additional Information	At time of release in 1965, it was the highest alpha acid hop in the world and went on to become more than 90% of the Australian crop- closely associated with such famous beers as Foster's Lager.

Personal Notes:



Hopunion CBS, LLC

STYRIAN GOLDING

Pedigree	An ecotype of Fuggle grown in Slovenia. Also known as Savinja Golding
Maturity	Early maturing
Yield	1300 – 1700 kg./ha. or 1150 – 1500 lb./ac.
Growth Habit	Fairly neat, not prolific
Disease/Pest Susceptibility	Moderately resistant to downy mildew. Sensitive to aphids and mites.
Pickability/Drying/Baling	Fair to good
Cone-Structure	Medium-compact, fairly small tight cone
Lupulin	Moderate amount, pale yellow
Aroma	Delicate, slightly spicy
Alpha Acids	4.5 – 6% w/w
Beta Acids	2 – 3% w/w
Co-Humulone	25 – 30% of alpha acids
Storageability	65 – 80% alpha acids remaining after 6 months storage at 20° C
Total Oil	0.5 – 1.0 mls/100 grams
Myrcene	27 – 33% of whole oil
Humulene	34 – 38% of whole oil
Caryophyllene	9 – 11% of whole oil
Farnesene	2 – 5% of whole oil
General Trade Perception	A world-renowned aroma hop with widespread usage in both ale and lager brewing.
Possible Substitutions	US Fuggle, Willamette, UK Fuggle
Typical Beer Styles	English style Ale, ESB, Lager, Pilsner, Belgian-Style Ales
Additional Information	The old traditional favorite of Slovenia. Also well-established in English brewing as Fuggle.
Personal Notes:	



Hopunion CBS, LLC

UK CHALLENGER

Pedigree	A granddaughter of Northern Brewer bred in England with German downy mildew resistant males.
Maturity	Late season
Yield	1600 – 2000 kg./ha. or 1400 – 1800 lb./ac.
Growth Habit	Beautiful neat columnar habit with even laterals, good head, and nicely hopped down.
Disease/Pest Susceptibility	Bred for resistance to downy mildew and some strains of powdery mildew. Sensitive to Verticillium wilt.
Pickability/Drying/Baling	Good
Cone-Structure	Good sized fairly firm cone
Lupulin	Moderate to copious amounts, mid-yellow
Aroma	Mild to moderate, quite spicy
Alpha Acids	6.5 – 8.5% w/w
Beta Acids	4 – 4.5% w/w
Co-Humulone	20 – 25% of alpha acids
Storageability	70 – 85% alpha acids remaining after 6 months storage at 20° C
Total Oil	1.0 – 1.7 mls/100 grams
Myrcene	30 – 42% of whole oil
Humulene	25 – 32% of whole oil
Caryophyllene	8 – 10% of whole oil
Farnesene	1 – 3% of whole oil
General Trade Perception	One of the few recognized dual-purpose hops combining moderate amounts of alpha acids with a good kettle hop aroma
Possible Substitutions	US or German Perle, Northern Brewer
Typical Beer Styles	English style Ale, Porter, Stout, ESB, Bitter, Barley Wine, Brown Ales
Additional Information	A result of Wye's efforts to combine higher levels of alpha acids with technically good aroma, disease resistance, and good agronomic properties. Released in 1968.

Personal Notes:



Hopunion CBS, LLC

UK FIRST GOLD

Pedigree	A cross-pollination of Whitbread Golding variety and a dwarf male
Maturity	Mid-season
Yield	1300 – 1900 kg./ha. or 1100 – 1700 lb./ac.
Growth Habit	Dwarf, short laterals, very well hopped down
Disease/Pest Susceptibility	Resistant to powdery mildew, moderate resistance to Verticillium wilt, susceptible to downy mildew
Pickability/Drying/Baling	Good
Cone-Structure	Good size firm cones
Lupulin	Plentiful
Aroma	A little like Golding, spicy
Alpha Acids	6.5 – 8.5% w/w
Beta Acids	3 – 4% w/w
Co-Humulone	31 – 36% of alpha acids
Storageability	Very good
Total Oil	0.7 – 1.5 mls/100 grams
Myrcene	27 – 28% of whole oil
Humulene	20 – 24% of whole oil
Caryophyllene	6 – 7% of whole oil
Farnesene	3% of whole oil
General Trade Perception	First commercial dwarf hop designed for aroma consideration in England, a very promising hop.
Possible Substitutions	UK Kent Golding, maybe Crystal
Typical Beer Styles	Ale, ESB
Additional Information	Early brewing trials look very favorable, limited acreage
Personal Notes:	



Hopunion CBS, LLC

UK FUGGLE

Pedigree	A chance seedling raised in England at about the turn of the century.
Maturity	Early to mid-season
Yield	1200 – 1500 kg./ha. or 1050 – 1350 lb./ac.
Growth Habit	Neat habit, fairly prolific, good grower hop
Disease/Pest Susceptibility	Some resistance to downy mildew. Sensitive to Verticillium wilt.
Pickability/Drying/Baling	Good
Cone-Structure	Medium small, quite light cone
Lupulin	Moderate amounts, mid-yellow
Aroma	Mild, pleasant and hoppy
Alpha Acids	4 – 5.5% w/w
Beta Acids	2 – 3% w/w
Co-Humulone	23 – 30% of alpha acids
Storageability	70 -80% alpha acids remaining after 6 months storage at 20° C
Total Oil	0.7 – 1.4 mls/100 grams
Myrcene	24 – 28% of whole oil
Humulene	35 – 40% of whole oil
Caryophyllene	11 – 13% of whole oil
Farnesene	5 – 7% of whole oil
General Trade Perception	A hop long associated with typical English Ale brewing. Imparts good hoppy late-hop flavor
Possible Substitutions	US Fuggle, Willamette, Styrian Golding
Typical Beer Styles	All English style Ales, ESB, Bitter, Lager, and Lambic
Additional Information	Once a predominant hop in England but now reserved for aroma use in conjunction with high alpha types.

Personal Notes:



Hopunion CBS, LLC

UK KENT GOLDING

Pedigree	The Goldings are the traditional Old English hop. Develops by clonal selection from 1790 on starting from Canterbury Whitebine.
Maturity	Early mid and late maturing sub-varieties exist
Yield	1500 – 1800 ka./ha. or 1350 – 1600 lb./ac.
Growth Habit	Ranges from vigorous growth types to fewer strong forms
Disease/Pest Susceptibility	Sensitive to downy mildew. As a group the Goldings are unique in their high level of sensitivity to Hop Mosaic Virus.
Pickability/Drying/Baling	Tendency to shatter especially if too dry
Cone-Structure	Fairly loose and lax, medium to large in size
Lupulin	Quite small amounts, pale yellow in color
Aroma	Gentle, fragrant and pleasant
Alpha Acids	4 – 5.5% w/w
Beta Acids	2 – 3.5% w/w
Co-Humulone	20 – 25% of alpha acids
Storageability	65 – 80% alpha acids remaining after 6 months storage at 20° C
Total Oil	0.6 – 1.0 mls/100 grams
Myrcene	20 – 26% of whole oil
Humulene	42 – 48% of whole oil
Caryophyllene	12 – 16% of whole oil
Farnesene	<1% of whole oil
General Trade Perception	The classic English Ale hop which has been used extensively in kettle hopping and for dry hopping.
Possible Substitutions	US Golding, Whitbread Golding, UK Progress
Typical Beer Styles	All English style Ales, Belgian-Style Ales
Additional Information	Traded as East-Kent Goldings, if grown in East Kent, Kent Goldings if grown in mid-Kent, and Goldings if grown elsewhere.
Personal Notes:	



Hopunion CBS, LLC

UK NORTHDOWN

Pedigree	A first generation selection from Northern Brewer crossed with a German male resistant to downy mildew
Maturity	Early to mid-season
Yield	1500 – 1900 kg./ha. or 1350 – 1700 lb./ac.
Growth Habit	Not over-vigorous, neat and manageable
Disease/Pest Susceptibility	Susceptible to Verticillium wilt and powdery mildew but quite resistant to downy mildew
Pickability/Drying/Baling	Good
Cone-Structure	Medium to large, plumpish, quite loose
Lupulin	Moderate amounts, palish yellow
Aroma	Mild, pleasant and delicate hop aroma
Alpha Acids	7.5 – 9.5% w/w
Beta Acids	5 – 5.5% w/w
Co-Humulone	24 – 30% of alpha acids
Storageability	60 – 70% alpha acids remaining after 6 months storage at 20° C
Total Oil	1.5 – 2.5 mls/100 grams
Myrcene	23 – 29% of whole oil
Humulene	40 – 45% of whole oil
Caryophyllene	13 – 17% of whole oil
Farnesene	<1% of whole oil
General Trade Perception	A true dual-purpose hop with moderate bittering potential and excellent flavor/aroma characteristics.
Possible Substitutions	UK Challenger, Northern Brewer
Typical Beer Styles	All Ales, Porter
Additional Information	Released in early 1970's with relatively high alpha acids for its time. Its excellent flavor properties ensured its continued survival after the release of the higher alpha acids variety Wye Target.
Personal Notes:	



Hopunion CBS, LLC

UK PROGRESS

Pedigree	A daughter of Whitbread's Golding variety (WGV1147) bred with wild American germplasm on the male side.
Maturity	Mid-season
Yield	1800 – 2300 kg./ha. or 1600 – 2050 lb./ac.
Growth Habit	Strong grower, dark in color, prolific cone producer
Disease/Pest Susceptibility	Bred for tolerance to Verticillium wilt. Susceptible to downy mildew.
Pickability/Drying/Baling	Good
Cone-Structure	Good-sized, firm, plump cone
Lupulin	Moderate amounts, fairly dark yellow in color
Aroma	Moderately strong, good aroma
Alpha Acids	5 – 7% w/w
Beta Acids	2 – 2.5% w/w
Co-Humulone	25 – 30% of alpha acids
Storageability	60 – 80% alpha acids remaining after 6 months storage at 20° C
Total Oil	0.6 – 1.2 mls/100 grams
Myrcene	30 – 35% of whole oil
Humulene	40 – 47% of whole oil
Caryophyllene	12 – 15% of whole oil
Farnesene	<1% of whole oil
General Trade Perception	A robust hop aroma type with moderate bittering potential.
Possible Substitutions	UK Kent Golding, Fuggle
Typical Beer Styles	Ale, Bitter, ESB, Porter
Additional Information	One of the very few aroma hops actually purpose-bred in a modern breeding program. Released in the mid-sixties just before brewer demand switched to high alpha acids so it never become very widely planted.

Personal Notes:



Hopunion CBS, LLC

UK TARGET

Pedigree	A second generation selection from Northern Brewer by a male seedling of English Goldings.
Maturity	Late season
Yield	1500 – 2000 kg./ha. or 1350 – 1800 lb./ac.
Growth Habit	Difficult to train but then quite vigorous and high yielding
Disease/Pest Susceptibility	Tolerant to Verticillium wilt and resistant to powdery mildew. Sensitive to downy mildew.
Pickability/Drying/Baling	Good
Cone-Structure	Smallish plump, but very tight cone
Lupulin	Abundant and medium yellow in color
Aroma	Pleasant English hop aroma, quite intense
Alpha Acids	9.5 – 12.5% w/w
Beta Acids	5 – 5.5% w/w
Co-Humulone	29 – 35% of alpha acids
Storageability	45 – 55% alpha acids remaining after 6 months storage at 20° C
Total Oil	1.6 – 2.6 mls/100 grams
Myrcene	45 – 55% of whole oil
Humulene	17 – 22% of whole oil
Caryophyllene	8 – 10% of whole oil
Farnesene	<1% of whole oil
General Trade Perception	A good high alpha variety with an acceptable to desirable kettle hop aroma.
Possible Substitutions	Fuggle, Willamette
Typical Beer Styles	All Ales and Lagers
Additional Information	The predominant UK variety at present and widely used for its high alpha acids content combined with an acceptable aroma. Normally used for bittering.
Personal Notes:	