



Charles Faram and Co Ltd

Charles Faram Hop Brochure 2002



Charles Faram and Co Ltd

www.charlesfaram.co.uk
email: enquiry@charlesfaram.co

Tel: 01905 830734
Fax: 01905 831790

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CZECH

SAAZ

Tall

Brewing Quality

Saaz hops have long been established as a high quality European aroma variety. Traditionally used for European lager type beers, they have now been used successfully in the UK imparting the earthy lager hop flavour found in the Czech version of Budweiser.

Origin

Saaz originates from the Czech Republic and are renowned for their high quality aroma. The variety has developed over many years from hops grown in and around the Zatec (Saazer) area.

Agronomics

Saaz hops are a low yielding high quality aroma variety. A lot of work has been carried out over the years in an attempt to improve the yield. This has been achieved through clone selection as it was feared that hybridisation would result in a loss of the traditional aroma characteristics. Until quite recently all research was aimed at improving the hops this way however some hybridisation has occurred in recent years to improve the susceptibility to Downy Mildew, Powdery Mildew and Verticillium Wilt. All the selections are marketed as Zatec (Saazer) hops and it is claimed that they are extremely uniform although there do seem to be some differences in the appearance of the cone if not the aroma.

Year	Hectares	Zentners	ZTR/Ha	Alpha%
1995	10070	198260	19.69	3.2
1996	9355	202520	21.65	4.0
		Avg	20.67	3.6

Analytical Information

Oil Composition

Alpha Acid %	2.0-5.0	Myrcene	42 %
Alpha/Beta Ratio	1:1.5-2.0	Caryophyllene	6 %
Beta Acid %	7.0-8.0	Farnesene	15 %
Co-humulone (%A.Acid)	26	Humulene	19 %
Total Oil %	0.7	Selinene	0.53 %



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GERMAN

BREWERS GOLD

Tall

Brewing Quality A well-tried and tested bitter hop. Brewers Gold has a high resin content and gives a well-balanced bitterness which is ideally complimented by a late aroma hop in Lager beers. When used in cask conditioned ales, can give some very interesting fruity and spicy characteristics

Origin Brewers Gold and Bullion were two of the first varieties developed from a breeding programme circa 1917 by Professor Salmon in England. His aim was to combine the high resin content of American hops with European style aroma, Brewers Gold is an open pollinated seedling of a wild Manitoba hop plant and was first produced in 1919.

Agronomics The bitter variety Brewers Gold grows readily, but is very susceptible to all the diseases affecting hops. It is now grown mainly in Southern Germany. Alpha Acid contents are greatly influenced by environmental conditions and therefore can vary quite significantly from year to year.

Year	Hectares	Zentners	ZTR/Ha	Alpha%
1995	1129	49848	44.15	4.8
1996	812	42213	51.99	6.7
1997	505	21322	42.22	8.1
1998	236	10148	43.00	7.3
1999	162	6998	43.20	5.9
		Avg	44.91	6.6

Analytical Information Oil Composition

Alpha Acid %	5-9	Myrcene	38.5 %
Beta Acid %	3.1	Caryophyllene	7.3 %
Co-humulone (%A.Acid)	40-48	Farnesene	0 %
Total Oil %	2.0	Humulene	30 %
		Selinene	1.8 %



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GERMAN

HALLERTAUER (MITTLERFRUH) Tall

Brewing Quality A delicate aroma hop used mainly over the years in Lager type beers. However, it has also been successful in the production of some of the lighter English cask conditioned ales.

Origin Grown in Hallertau, Spalt, Hersbruck, Tettwang and Baden-Bitburg-Rheinpfalz areas of Germany "Hallertauer Mittelfrüher" is the traditional Hallertau variety although its acreage is gradually decreasing due to disease.

Agronomics Very susceptible to Verticillium Wilt and is no longer planted in Wilt threatened areas. Average resistance to Peronospora and Powdery Mildew. Matures medium to late season.

Year	Hectares	Zentners	ZTR/Ha	Alpha%
1995				
1996				
1997				4.6
1998	1381	33696	24.40	4.4
1999	1398	35649	25.50	3.9
		Avg	24.95	4.3

Analytical Information Oil Composition

Alpha Acid %	4.6	Myrcene	15.5 %
Beta Acid %	4.7	Caryophyllene	14.6 %
Total Oil %	1.0	Farnesene	0.1 %
		Humulene	55.1 %
		Selinene	1.5 %



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GERMAN

HALLERTAUEHERSBRUCKER Tall

Brewing Quality A delicate aroma hop used mainly over the years in Lager type beers. However, it has also been successful in the production of some of the lighter English cask conditioned ales. A floral, slightly fruity flavour

Origin Hersbrucker originates from the Hersbruck region of Southern Germany and has developed into a variety with the largest acreage, especially in the Hallertau area. It is also grown in the Spalt region.

Agronomics An aroma variety ripening mid-late to late season. The variety is susceptible to Peronospora with an average resistance to Powdery Mildew and Verticillium Wilt.

Year	Hectares	Zentners	ZTR/Ha	Alpha%
1995	4797	145982	30.43	2.2
1996	3973	158284	39.84	3.7
1997	3104	99357	32.01	4.6
1998	2408	76334	31.70	3.4
1999	2003	63495	31.70	1.9
		Avg	33.14	3.2

Analytical Information Oil Composition

Alpha Acid %	2-5	Myrcene	12.7 %
Beta Acid %	5.7	Caryophyllene	13.6 %
Total Oil %	0.7	Farnesene	0 %
		Humulene	32.4 %
		Selinene	12.8 %



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GERMAN

NORTHERN BREWER

Tall

Brewing Quality The English variety Northdown is a direct descendant of Northern Brewer and has very similar brewing characteristics. Used as a Dual-Purpose variety it gives excellent bittering properties and pleasant aroma.

Origin Developed from a cross between a male seedling of Brewers Gold with Canterbury Golding in the 1940s.

Agronomics Northern Brewer is a moderate yielding bittering hop, resistant to Verticillium Wilt but with only average resistance to Powdery Mildew and Peronospora. High acreage is grown in the Hallertau region. Also planted in Belgium and Spain.

Year	Hectares	Zentners	ZTR/Ha	Alpha%
1995	3141	104058	33.13	7.4
1996	2744	107619	39.22	9.4
1997	2962	84522	28.54	10.0
1998	2268	73256	32.30	8.5
1999	2009	58261	29.00	8.8
		Avg	32.44	8.8

Analytical Information

Alpha Acid %	6-10
Beta Acid %	3.4
Co-humulone (%A.Acid)	28-31
Colupulone	50-52
Total Oil %	1.3

Oil Composition

Myrcene	36.4 %
Caryophyllene	12.4 %
Farnesene	0.1 %
Humulene	30.7 %
Selinene	1.6 %



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PERLE

Tall

Brewing Quality

Perle is generally perceived as an excellent aroma hop, with characteristics as good as those of Hallertau Mittelfruh but with a higher Alpha Acid content and better yield. Storageability is good to very good.

Origin

This variety was bred at the Hop Research Institute in Hüll, Germany and released in 1978.

Agronomics

This high yielding aroma variety is popular with growers, thanks to its good resistance to disease. It has a good to very good resistance to Verticillium Wilt and Peronospora and average to Powder Mildew. It is grown in the Hallertau, Spalt, Hersbruck and Baden-Bitburg-Rheinpfalz areas of Southern Germany.

Year	Hectares	Zentners	ZTR/Ha	Alpha%
1995	3580	122427	34.20	5.3
1996	3733	163468	43.79	7.4
1997	3985	131768	33.07	8.7
1998	3623	121371	33.50	6.4
1999	3251	105332	32.40	6.7
		Avg	35.39	6.9

Analytical Information

Oil Composition

Alpha Acid %	6-10	Myrcene	23 %
Beta Acid %	3.2	Caryophyllene	9.1 %
Co-humulone (%A.Acid)	28-32	Farnesene	0 %
Colupulone	52-56	Humulene	35 %
Total Oil %	1.1	Selinene	0.6 %



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GERMAN

SPALT SELECT

Tall

- Brewing Quality** An exciting new triploid "finger print" replica bred from the famous Hallertau Mittlefruh variety. This is the newest of the Hallertau type triploids and is an aroma hop in the classic style.
- Origin** Spalt Select is an aroma type cultivar, bred in Germany and released for cultivation in the late 1980's. It is grown in Germany in the Hallertau and Spalt areas and in the USA in Washington State.
- Agronomics** Tolerant to Verticillium wilt, downy mildew and Peronospera.
Maturity:Late
Yield:1800-2000 kgs per ha.
1600-1800 lbs per acre

Analytical Information Oil Composition

Alpha Acid %	3.5-5.5	Myrcene	32.08 %
Alpha/Beta Ratio	1:1	Caryophyllene	12.89 %
Beta Acid %	6.2	Farnesene	0.059 %
Co-humulone (%A.Acid)	25.8	Humulene	36.24 %
		Selinene	0.358 %



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GERMAN

TETTNANG

Tall

Brewing Quality

Tettnang variety is a very fine traditional aroma hop, well established in the European Lager type beers. They have been used successfully in traditional lighter English cask ales.

Origin

An aroma variety which is grown mainly in the Tettnang cultivation area of Baden-Bitburg-Rheinpfalz region of Southern Germany. Some growers in the Hallertau region are also now growing this variety.

Agronomics

Tettnang is a good yielding variety with average resistance to Peronospora and good resistance to Verticillium Wilt.

Year	Hectares	Zentners	ZTR/Ha	Alpha%
1997	1102	30956	28.09	4.8
1998	1070			3.7
1999	1060			3.8
		Avg	28.09	4.1

Analytical Information

Oil Composition

Alpha Acid %	3-6	Myrcene	20.3 %
Beta Acid %	4.4	Caryophyllene	10.8 %
Co-humulone (%A.Acid)	43-46	Farnesene	15.8 %
Colupulone	25-29	Humulene	25.4 %
Total Oil %	0.8	Selinene	0 %



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NEW ZEALAND

GREEN BULLET

Tall

Brewing Quality A sleek smooth hop which has averaged over 12% alpha over a number of years and its aroma qualities match its excellent bittering power as New Zealand Breweries have proved in their award winning products. Green Bullet has been likened to giving a Styrian style of flavour to the beer as gives a pine/lemon crispness and an excellent aroma.

Origin Breeding history parent- Smoothcone x open pollinated
Developed - New Zealand DSIR Research Station Riwaka
Ploidy level - Triploid
Date released - 1972
Type - High Alpha

Agronomics Maturity date:- Late Season

Year	Hectares	Zentners	ZTR/Ha	Alpha%
1995		1999		13.4
1996		1907		13.5
1997		1917		14.0
1998		1120		14.9
1999	29	1408	48.55	14.1
2000	27	1103	40.85	14.0
		Avg	44.70	14.0

Analytical Information

Alpha Acid %	11-15
Alpha/Beta Ratio	1.8:1
Beta Acid %	7.0
Co-humulone (%A.Acid)	41.3
Total Oil %	1.1

Oil Composition

Myrcene	52.2 %
Caryophyllene	6.4 %
Farnesene	0 %
Humulene	19.5 %
Selinene	0.144 %



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NEW ZEALAND

HALLERTAUEER AROMA

Tall

Brewing Quality A fine clean triploid Hallertau bred from the classic Hallertau Mittlefruh variety. A floral, vanilla flavour which is excellent in lighter coloured beers.

Origin Breeding history parent- Hallertauer x open pollinated
Developed - New Zealand DSIR Research Station Riwaka
Ploidy level - Triploid
Date released - 1988
Type - Aroma

Agronomics Maturity date:- Early season

Year	Hectares	Zentners	ZTR/Ha	Alpha%
1995		2889		9.4
1996		3219		8.8
1997		3514		10.0
1998		4054		8.8
1999	116	3954	34.09	8.2
2000	127	5324	41.92	9.7
		Avg	38.00	9.1

Analytical Information

Alpha Acid %	7-11
Alpha/Beta Ratio	1.2:1
Beta Acid %	6.0
Co-humulone (%A.Acid)	35.2
Total Oil %	1.0

Oil Composition

Myrcene	47.27 %
Caryophyllene	6.24 %
Farnesene	5.06 %
Humulene	12.45 %
Selinene	1.841 %



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NEW ZEALAND

PACIFIC GEM

Tall

Brewing Quality A high alpha hop with a pleasant aroma and useful bitterness level of 13% alpha. Pacific Gem is very fruity with distinct berryfruit aroma that is prized by many brewers.

Origin Breeding history parent- Smoothcone x Early Male
Developed - New Zealand DSIR Research Station Riwaka
Ploidy level - Triploid
Date released - 1987
Type - High Alpha

Agronomics Maturity date:- Early/mid season

Year	Hectares	Zentners	ZTR/Ha	Alpha%
1995		4112		15.5
1996		4324		14.6
1997		3826		15.3
1998		2910		15.6
1999	69	3749	54.33	16.0
2000	69	3713	53.81	17.1
		Avg	54.07	15.7

Analytical Information

Alpha Acid %	13-18
Alpha/Beta Ratio	1.7:1
Beta Acid %	8.2
Co-humulone (%A.Acid)	38.5
Total Oil %	1.4

Oil Composition

Myrcene	55.35 %
Caryophyllene	6.56 %
Farnesene	0.048 %
Humulene	17.97 %
Selinene	0.198 %



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NEW ZEALAND

PACIFIC HALLERTAU

Tall

Brewing Quality An exciting new triploid "finger print" replica bred from the famous Hallertau Mittlefruh variety. This is the newest of the Hallertau type triploids and is an aroma hop in the classic style.

Origin Breeding history parent- Hallertau Mittlefruh x open pollinated
Developed - New Zealand DSIR Research Station Riwaka
Ploidy level - Triploid
Date released - 1994
Type - Aroma

Agronomics Maturity date:- Early

Year	Hectares	Zentners	ZTR/Ha	Alpha%
1996		81		5.6
1997		238		6.2
1998		492		6.3
1999	37	1097	29.65	5.0
2000	40	1330	33.25	6.5
		Avg	31.45	5.9

Analytical Information

Oil Composition

Alpha Acid %	3-6	Myrcene	32.08 %
Alpha/Beta Ratio	1:1	Caryophyllene	12.89 %
Beta Acid %	6.2	Farnesene	0.059 %
Co-humulone (%A.Acid)	25.8	Humulene	36.24 %
Total Oil %	1.2	Selinene	0.358 %



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SLOVENIAN

STYRIAN GOLDINGS

Tall

Brewing Quality

This distinguished variety is well known throughout the world and although identical to Fuggle in many ways it does have its own distinctive characteristics. The perfume-like hoppy character that was again used mainly in European lagers works very well in the less malty flavoured golden coloured beers.

Origin

Although known in Slovenia as the Savinja Golding this variety is the same as the English Fuggle. It is recorded that hops were introduced into Slovenia from England and it seems likely that the Fuggle variety was supplied under the misnomer of "Fuggles Goldings" - a practice at one time resorted to since Goldings were deemed to be of superior quality to Fuggles. The variety was full adopted by Slovenia in 1930 when their other varieties were exterminated by Powdery Mildew

Agronomics

Styrian Golding is a low to moderate yielding aroma variety that matures early to mid-season. It is susceptible to Downy and Powdery Mildew and particularly susceptible to Verticillium Wilt.

Analytical Information Oil Composition

Alpha Acid %	3-6	Myrcene	25-38 %
Alpha/Beta Ratio	1:5	Caryophyllene	9.0-12.0 %
Beta Acid %	1.8-4.1	Farnesene	6.0-8.0 %
Co-humulone (%A.Acid)	27-33	Humulene	29-38 %
Total Oil %	0.3-1.7	Selinene	n/a %



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UK HOP

ADMIRAL

Tall

Brewing Quality

Very good high alpha hop that will be mainly used as a replacement for Target in extracts and pellets where bitterness value is the main consideration. Not as harsh as Target in terms of quality of bitterness and has a very pleasant hoppy character.

Origin

Bred at HRI Wye to increase the range of UK high alpha varieties. Released commercially in 1995

Agronomics

Admiral is a high yielding, high alpha variety that matures mid-season and so complements Target in terms of the picking regime. It grows vigorously, producing small, compact cones, which pick well on the machine. It has a question mark over it in terms of Wilt tolerance and is susceptible to powdery mildew, however it is resistant to downy mildew.

Year	Hectares	Zentners	ZTR/Ha	Alpha%
1998	18	443	24.61	15.2
1999	26	643	24.73	13.8
2000	46	958	20.83	14.9
2001	80	1642	20.52	14.5
		Avg	22.67	14.6

Analytical Information

Alpha Acid %	13.5-16.2
Alpha/Beta Ratio	2.9:1
Beta Acid %	4.8-6.0
Co-humulone (%A.Acid)	37-45
Total Oil %	1.0-1.7



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UK HOP

BRAMLING CROSS

Tall

Brewing Quality

A hop of considerable character. Its distinctive "American" aroma put many brewers off this variety in its early years. It has a strong spicy / blackcurrant flavour and good alpha characteristics. Bramling Cross has now made something of a comeback in traditional cask conditioned beers because of its very distinctive characteristics and has done very well in all styles of beer.

Origin

Bred from a cross in 1927 between Bramling (one of the traditional Golding varieties) and a male seedling of the Manitoban (Canadian) wild hop. Also known as O.T.48, this variety was developed at Wye College by Professor Salmon.

Agronomics

Bramling Cross is a low yielding aroma variety that is grown primarily in Kent and Sussex. It matures early, fitting nicely into the start of the picking season it is generally easier to grow than other varieties and is therefore very much a "grower's hop". The variety is susceptible to Downy and Powdery Mildew but shows a high degree of tolerance to Verticillium Wilt.

Year	Hectares	Zentners	ZTR/Ha	Alpha%
1995	46	888	19.30	6.6
1996	53	1550	29.25	6.5
1997	51	1649	32.33	7.1
1998	35	794	22.69	6.4
1999	25	582	23.28	6.0
2000	21	437	20.81	5.8
2001	17	453	26.65	6.1
		Avg	24.90	6.4

Analytical Information

Oil Composition

Alpha Acid %	5.0 - 7.0	Myrcene	36.54 %
Alpha/Beta Ratio	2.20:1	Caryophyllene	15.72 %
Beta Acid %	2.3-3.2	Farnesene	0.21 %
Co-humulone (%A.Acid)	34	Humulene	30.57 %
Total Oil %	0.7-1.0	Selinene	4.02 %



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UK HOP

CHALLENGER

Tall

Brewing Quality

An excellent all round hop with good alpha and aroma properties. As the main copper hop it provides a refreshing, full bodied, rounded bitterness which provides an excellent platform for a light beer. As the late addition it can give a very crisp, fruity character which has proved very popular in many beers.

Origin

Introduced by Wye College in 1972 this variety was bred from two trial varieties. It is very well related with its grandmother being Northern Brewer and its aunt - Northdown.

Agronomics

Challenger is a high yielding dual-purpose variety grown primarily in Herefordshire and Worcestershire although quantities are grown in Kent and Belgium. It has good resistance to Downy Mildew but is susceptible to Powdery Mildew and Verticillium Wilt.

Year	Hectares	Zentners	ZTR/Ha	Alpha%
1995	341	9128	26.77	7.3
1996	309	10917	35.33	8.4
1997	288	8254	28.66	7.5
1998	211	6231	29.53	7.6
1999	183	5193	28.38	6.8
2000	153	4473	29.24	8.0
2001	128	3632	28.38	7.6
		Avg	29.47	7.6

Analytical Information Oil Composition

Alpha Acid %	5-9	Myrcene	30.49 %
Alpha/Beta Ratio	2.0:1	Caryophyllene	9.52 %
Beta Acid %	3.2-4.2	Farnesene	1.73 %
Co-humulone (%A.Acid)	20-25	Humulene	29.52 %
Total Oil %	1.0-1.5	Selinene	12.87 %



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UK HOP

FIRST GOLD

Hedgerow

Brewing Quality

The variety is very suitable both as a general kettle hop and also for late and dry hopping in all types of beer. First Gold has good aroma and bittering qualities, much of the flavour of WGV seems to have been retained but with an added extra citrus quality, produces a well-balanced bitterness and a fruity, slightly spicy note in ales. An orangey quality has been observed in many beers brewed using this variety.

Origin

A dwarf hop bred at Wye College, on extensive farm trials in 1995. First Gold is from a cross-pollination of WGV with a dwarf male. It has a very attractive aroma which some liken to Goldings but with a higher Alpha content than traditional aroma hops.

Agronomics

First Gold crops with a larger number of medium-sized cones and yields well on the trial sites. Reasonable tolerance to Verticillium Wilt which seems to be inherited from its WGV parent. Susceptible to Downy mildew, resistant to Powdery mildew.

Year	Hectares	Zentners	ZTR/Ha	Alpha%
1996	96	791	8.24	9.0
1997	160	3089	19.31	8.9
1998	162	3184	19.65	7.3
1999	129	2691	20.86	7.9
2000	164	3311	20.19	8.4
2001	162	4112	25.38	8.7
		Avg	18.94	8.4

Analytical Information

Alpha Acid %	6-10
Alpha/Beta Ratio	2.1:1
Beta Acid %	3.0-4.1
Co-humulone (%A.Acid)	33
Total Oil %	0.7-1.3



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UK HOP

FUGGLE

Tall

Brewing Quality

The delicate, minty, grassy, slightly floral aroma produces a clean, refreshing, full-bodied flavour present in many traditional ales. Before the advent of dual purpose and high alpha hops Fuggles were used as the main copper hop and were often complimented by an addition of Golding to give rounded, full-bodied flavour for which English Ales became famous.

Origin

It is reputed that Mr. Fuggle of Brenchley in Kent originally selected this variety as a seedling in 1861. It was finally introduced into commerce about 1875. Fuggle was the dominant hop variety in England for over 70 years until the development of high alpha varieties made it less economical for bittering purposes. Probably the most famous traditional English aroma variety Fuggles are also grown in Slovenia as Styrian Golding and the USA as Oregon Fuggle.

Agronomics

Fuggle is a low to moderate yielding aroma variety that matures early to mid-season. It is grown primarily in Herefordshire and Worcestershire after many of the Kent farms became infected with Verticillium Wilt. Several attempts have been made over the years to breed a wilt-resistant Fuggle but with very little success.

Year	Hectares	Zentners	ZTR/Ha	Alpha%
1995	308	6215	20.18	4.4
1996	305	9360	30.69	4.8
1997	316	80	0.25	4.9
1998	321	7689	23.95	5.1
1999	313	7259	23.19	4.7
2000	271	6808	25.12	5.1
2001	237	5402	22.79	5.3
		Avg	20.88	4.9

Analytical Information Oil Composition

Alpha Acid %	3-6	Myrcene	25.04 %
Alpha/Beta Ratio	1.8:1	Caryophyllene	13.38 %
Beta Acid %	2.2-3.1	Farnesene	5.72 %
Co-humulone (%A.Acid)	33	Humulene	38.47 %
Total Oil %	0.7-1.1	Selinene	2.43 %



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UK HOP

GOLDING

Tall

Brewing Quality

A traditional English aroma variety valued for its smooth (almost sweet), delicate, slightly spicy aroma that produces the classic Golding finish. As with Fuggles it forms the basis of many well-known and respected recipes.

Origin

Goldings have been grown in England for over 100 years and as with Fuggle were named after the grower who developed them. The variety includes clones that differ in maturity and it is therefore possible to spread picking over the whole of the harvest period. In 1995 Goldings were planted in the USA for the first time, initial results have been good.

Agronomics

Golding is a moderate to high yielding aroma variety that is grown in Herefordshire and Worcestershire and East Kent, both areas are under pressure from wilt infection to which Golding is particularly susceptible. The acreage has increased over the last few years due to demand for this variety. It is susceptible to Downy and Powdery Mildew and particularly sensitive to Verticillium Wilt.

Year	Hectares	Zentners	ZTR/Ha	Alpha%
1995	402	9384	23.34	5.2
1996	450	13456	29.90	5.7
1997	485	13216	27.25	5.9
1998	485	13623	28.09	6.3
1999	438	11896	27.16	5.2
2000	371	12529	33.77	6.4
2001	349	9516	27.27	5.7
		Avg	28.11	5.8

Analytical Information

Alpha Acid %	4.0-7.
Alpha/Beta Ratio	2.3:1
Beta Acid %	2.0-2.8
Co-humulone (%A.Acid)	28
Total Oil %	0.8-1.0

Oil Composition

Myrcene	24.91 %
Caryophyllene	14.75 %
Farnesene	0.41 %
Humulene	45.26 %
Selinene	2.59 %



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HERALD

Hedgerow

Brewing Quality

Still in the very early stages of production very few beers have been produced from this hop but in brewing trials, the flavour and bittering balance has been found very acceptable. This variety will be excellent as a substitute for dual-purpose or high alpha varieties in all types of beer and particularly useful as a replacement for Target where Target is found to have too harsh a bitterness. In aroma terms Herald produces a well-rounded gentle grapefruit/citrus flavour.

Origin

This is the first high-alpha dwarf hop bred at Wye College with acceptable flavour properties. This hop is a sister to Pioneer

Agronomics

Maturing early season, it has a high resistance to Verticillium Wilt, is resistant to Powdery Mildew and has some resistance to Downy Mildew.

Year	Hectares	Zentners	ZTR/Ha	Alpha%
1996	4	61	15.25	12.6
1997	33	108	3.27	12.4
1998	54	229	4.24	11.9
1999	55	1042	18.95	12.5
2000	55	588	10.69	12.8
2001	54	1092	20.22	14.0
		Avg	12.10	12.7

Analytical Information

Alpha Acid %	9.0-13.0
Beta Acid %	4.8-5.5
Co-humulone (%A.Acid)	37
Colupulone	n/a
Total Oil %	1.0-1.9



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NORTHDOWN

Tall

Brewing Quality

An excellent all round hop in the dual-purpose bracket with good alpha and aroma properties. Very popular used either on its own or in conjunction with an aroma variety. A slightly richer flavour than Challenger although quite similar in many other ways.

Origin

Northdown was released by Wye College in 1970; it is a seedling of Northern Brewer, crossed with a Downy mildew-resistant male. It is an "aunt" of Challenger and Target. It provides cheaper alpha acid than many traditional varieties, while having excellent flavour properties

Agronomics

Northdown is a high yielding dual-purpose variety that is grown primarily in Herefordshire and Worcestershire. It has good resistance to Downy Mildew but is susceptible to Powdery Mildew and Verticillium Wilt.

Year	Hectares	Zentners	ZTR/Ha	Alpha%
1995	359	10381	28.92	8.2
1996	323	12069	37.37	9.6
1997	312	9080	29.10	8.6
1998	181	5471	30.23	8.8
1999	140	4268	30.49	7.8
2000	98	3103	31.66	8.2
2001	71	1956	27.55	7.4
		Avg	30.76	8.4

Analytical Information Oil Composition

Alpha Acid %	6-10	Myrcene	26-36 %
Alpha/Beta Ratio	1.6:1	Caryophyllene	15 %
Beta Acid %	4.4-6.2	Farnesene	1.1 %
Co-humulone (%A.Acid)	24-29	Humulene	43 %
Total Oil %	1.2-2.2	Selinene	2 %



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PHOENIX

Tall

Brewing Quality

In brewing trials Phoenix has performed well as a replacement for high alpha or dual purpose hop early in the boil. Late hop additions for aroma have tended to be disappointing with only very mellow aromas coming through. From early storage trials stability of the alpha acids in Phoenix are excellent.

Origin

Phoenix is an early-ripening Wilt resistant dual-purpose variety (9 - 13% alpha) which was developed at Wye College at the same time as Admiral. It is a seedling of the high alpha variety Yeoman.

Agronomics

Phoenix has a neat growth habit and hops down well. It produces good-sized cones that pick well with little waste. The variety has shown excellent resistance to Verticillium Wilt (even higher than that of Target) and ripens early to give the grower a variety that slots well into existing picking regimes.

Year	Hectares	Zentners	ZTR/Ha	Alpha%
1996	108	1178	10.91	11.8
1997	179	3033	16.94	10.8
1998	157	3155	20.10	12.1
1999	140	3348	23.91	11.0
2000	137	3576	26.10	12.2
2001	124	2960	23.87	11.5
		Avg	20.31	11.6

Analytical Information

Alpha Acid %	8-12
Alpha/Beta Ratio	2.1:1
Beta Acid %	4.2-5.5
Co-humulone (%A.Acid)	30
Total Oil %	1.2-2.5



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PILGRIM

Tall

Brewing Quality

In brewing trials Pilgrim has performed well as a replacement for high alpha or dual purpose hops. Because of its alpha it has been compared to Target more than any other variety. It has however a much hoppier aroma than Target due to its higher levels of Humulene and Challenger-like Selinene levels. From early storage trials stability of the alpha acids in Pilgrim seem to be excellent.

Origin

Pilgrim is a mid-late ripening very Wilt resistant dual-purpose variety (9 - 13% alpha) which was developed at HRI Wye and released in 2000. It has the same father as First Gold and Herald although it is not a dwarf variety.

Agronomics

Pilgrim has a very vigorous growth habit and has good resistance to both powdery and downy mildew. It has shown to be the most Wilt resistant variety to date and is a very high yielder.

Year	Hectares	Zentners	ZTR/Ha	Alpha%
2001	23	263	11.43	11.6
		Avg	11.43	11.6

Analytical Information Oil Composition

Alpha Acid %	9-13	Myrcene	36 %
Alpha/Beta Ratio	2.4:1	Caryophyllene	7.3 %
Beta Acid %	4.3-5.0	Farnesene	0.3 %
Co-humulone (%A.Acid)	36-38	Humulene	16.9 %
Total Oil %	1.8	Selinene	8.6 %



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PIONEER

Hedgerow

Brewing Quality

The variety has proved to be quite unusual with a very pleasant, lemon, citrus aroma. Initial brews have proved to be very successful with very distinctive, hoppy characteristics

Origin

Pioneer, a dual-purpose hop that is a sister to the new English Herald hop and distantly related to Wye Yeoman. It combines a pleasant aroma with a moderately high (8-10%) alpha acid content. It shows vigorous growth and produces a firm hedge of cones.

Agronomics

It has a co-humulone of 36-40% Of alpha acid with good storageability. The 1995 harvest should be one hectare only, yielding 26-34 zentners per hectare. It is resistant to powdery mildew, and has moderate resistance to verticillium wilt and downy mildew.

Year	Hectares	Zentners	ZTR/Ha	Alpha%
1996	3	36	12.00	8.4
1997	3	38	12.67	9.4
1998	4	37	9.25	8.6
1999	2	15	7.50	9.1
2000	2	26	13.00	9.8
		Avg	10.88	9.1

Analytical Information

Alpha Acid %	7.0-11.0
Alpha/Beta Ratio	2.4:1
Beta Acid %	3.5-4.0
Co-humulone (%A.Acid)	37
Total Oil %	0.8-1.8



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PROGRESS

Tall

Brewing Quality

Progress was originally introduced as a replacement for Fuggle and has very similar characteristic. Slightly sweeter and with a slightly softer bitterness it has excellent potential at both the start and end of the boil.

Origin

Seedling of WGV crossed with O.B.79 (A trial male which was the grandfather of Target). Developed at Wye College in 1951 Progress wasn't released for commercial production until 1964. Its Wilt tolerance made it an ideal replacement for Fuggle on farms where Wilt was active.

Agronomics

Progress is a very variable yielding aroma variety that is grown primarily in Kent and Sussex but is now also being tried on farms in Herefordshire and Worcestershire. The variety is susceptible to Downy and Powdery Mildew but shows a high degree of tolerance to Verticillium Wilt.

Year	Hectares	Zentners	ZTR/Ha	Alpha%
1995	173	3166	18.30	6.0
1996	180	5225	29.03	7.1
1997	182	6163	33.86	6.2
1998	121	3574	29.54	7.0
1999	83	2169	26.13	5.8
2000	52	1342	25.81	7.2
2001	41	765	18.66	6.1
		Avg	25.90	6.5

Analytical Information

Alpha Acid %	4-7
Alpha/Beta Ratio	2.3:1
Beta Acid %	2.0-2.8
Co-humulone (%A.Acid)	28
Total Oil %	0.8-1.0



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TARGET

Tall

Brewing Quality

An excellent high alpha variety which gives bitterness at a very competitive price. Tends to be too harsh for aroma purposes late in the boil but has produced very good results when used as dry hop pellets in the cask.

Origin

Target was released in 1972 and was the first result of a Wye College breeding programme to produce a wilt tolerant high alpha variety. It has rapidly established itself as the most widely grown English variety, with nearly half of the market.

Agronomics

Target is a moderate yielding high alpha variety that was grown primarily in Kent and Sussex. However due to the incidence of Wilt it has now also become prominent in Herefordshire and Worcestershire. It is susceptible to Downy Mildew but has good resistance to both Powdery Mildew and Verticillium Wilt.

Year	Hectares	Zentners	ZTR/Ha	Alpha%
1995	1242	38414	30.93	11.4
1996	1096	43943	40.09	11.4
1997	864	31578	36.55	11.4
1998	580	17652	30.43	11.3
1999	542	18754	34.60	10.7
2000	503	16451	32.71	11.9
2001	497	18202	36.62	11.8
		Avg	34.56	11.4

Analytical Information

Alpha Acid %	8-13
Alpha/Beta Ratio	2.2:1
Beta Acid %	4.5-5.7
Co-humulone (%A.Acid)	37
Total Oil %	1.2-1.4



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W.G.V.

Tall

Brewing Quality

Very similar to Goldings but not quite as delicate, with a hoppier more robust aroma and containing more alpha.

Origin

WGV is an open pollinated seedling of Bates Brewer that was on a farm at Beltring in Kent, later bought by the Whitbread Beer Company.

Agronomics

WGV is a low yielding aroma variety that is grown primarily in Kent. Showed excellent yields in 1993 which has encouraged small areas of planting in 1994. The variety is susceptible to Downy and Powdery Mildew but shows a small degree of tolerance to Verticillium Wilt.

Year	Hectares	Zentners	ZTR/Ha	Alpha%
1995	106	1980	18.68	6.2
1996	141	3365	23.87	6.5
1997	164	4655	28.38	6.4
1998	111	3226	29.06	6.6
1999	86	2118	24.63	5.9
2000	79	1937	24.52	7.2
2001	65	1137	17.49	6.5
		Avg	23.80	6.5

Analytical Information

Alpha Acid %	5-8
Alpha/Beta Ratio	2.8:1
Beta Acid %	2.0-2.7
Co-humulone (%A.Acid)	34
Total Oil %	0.8-1.2

Oil Composition

Myrcene	26 %
Caryophyllene	13 %
Farnesene	2 %
Humulene	41-48 %
Selinene	3 %



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AHTANUM

Tall

Brewing Quality

Used for its aromatic properties and moderate bittering.
Storageability is fair to good.

A very distinctive hop from the USA.

Origin

Ahtanum is an aroma-type cultivar bred by Yakima Chief Ranches. Its name is derived from the area near Yakima where the first hop farm was established in 1869 by Charles Carpenter.

Agronomics

Ahtanum is tolerant to downy mildew, with good pickability of a small compact cone.
Maturity: Medium-late
Yield: 2050-2250 kg per ha.
(1775-1950 lbs per acre.)

Analytical Information Oil Composition

Alpha Acid %	5.7-6.3	Myrcene	50-55 %
Alpha/Beta Ratio	1.1:1	Caryophyllene	9-12 %
Beta Acid %	5.0-6.5	Farnesene	0 %
Co-humulone (%A.Acid)	30-35	Humulene	16-20 %
Total Oil %	0.8-1.2	Storageability	50-55 %



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CASCADE

Tall

Brewing Quality

Cascade has a unique floral/spicy aroma both in the cone form and in the beer, mainly due to abnormal levels of some of the essential oils. It is very popular with some brewers due to the unique character imparted to the finished beer, others object to it because of its "perfume like" hoppy flavour. Trial brews and tastings also show a superior bitterness quality with Cascade even at high EBU levels (40+) there is little harshness or lingering bitterness. Storageability is relatively poor unless vacuum packed.

Origin

The Cascade cultivar is an aroma variety that was developed in Oregon in the early 1970s. It is the result of the open pollination of a Fuggle-type seedling that was derived from crosses with the Russian Serebrianker variety.

Agronomics

Cascade is a good yielding aroma variety that matures mid-season. It is grown primarily in Washington State. It is very tolerant to Downy Mildew and is moderately tolerant to Prunus necrotic ring-spot virus and Verticillium Wilt. It is very susceptible to aphids and moderately susceptible to spider mites.

Year	Hectares	Zentners	ZTR/Ha	Alpha%
1995	456	22104	48.47	4.2
1996	423	19150	45.27	6.0
1997	420	18439	43.90	5.5
1998	401	16199	40.40	5.0
1999	367	16521	45.02	5.6
2000	403	16319	40.49	5.8
2001	406	16242	40.00	6.0
		Avg	43.37	5.4

Analytical Information Oil Composition

Alpha Acid %	4.0-7.0	Myrcene	45-60 %
Alpha/Beta Ratio	0.9:1	Caryophyllene	3-6 %
Beta Acid %	4.5-7.0	Farnesene	4-8 %
Co-humulone (%A.Acid)	33-40	Humulene	10-16 %
Total Oil %	0.8-1.5	Storageability	48-52 %



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CENTENNIAL

Tall

Brewing Quality An experimental variety which is under evaluation by UK and US brewers. It has quite floral qualities similar to that of Cascade.

Origin Selected from a cross between Brewers Gold and a selected USDA male.

Agronomics Good, neat well hopped bines maturing mid-season. A medium sized dense compact cone. No visible reaction to infection with Prunus necrotic ring-spot virus. Moderately resistant to Verticillium Wilt.

Analytical Information Oil Composition

Alpha Acid %	6-11	Myrcene	45-55 %
Beta Acid %	3.5-4.5	Caryophyllene	5-8 %
Co-humulone (%A.Acid)	29-30	Farnesene	<1 %
Total Oil %	1.5-2.3	Humulene	10-18 %
		Storageability	60-65 %



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CHINOOK

Tall

Brewing Quality

A high alpha acid hop with a very unusual aroma profile. Released in 1985 and becoming increasingly more popular, Chinook has a very strong grapefruit character in both the rub of the hop and in the beer. Ideal for one-off and seasonal specials

Origin

Developed from a cross between a Petham Golding and a US selected male with high alpha acids and good storageability.

Agronomics

Maturing mid to late season. The cones are long, medium compact with outward turning petals. Tolerant to infection with Prunus necrotic ring-spot virus, moderately tolerant to Downy Mildew. Not excessively sensitive to insects.

Year	Hectares	Zentners	ZTR/Ha	Alpha%
1996				10.2
1997	823	33488	40.69	11.4
1998	563	18856	33.49	11.4
1999	402	17835	44.37	12.0
2000	340	14979	44.06	11.8
2001	266	10104	37.98	12.4
		Avg	40.12	11.5

Analytical Information Oil Composition

Alpha Acid %	10-15	Myrcene	35-40 %
Beta Acid %	3.0-4.0	Caryophyllene	9-11 %
Co-humulone (%A.Acid)	29-34	Farnesene	<1 %
Total Oil %	1.5-2.5	Humulene	20-25 %
		Storageability	65-70 %



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CLUSTER

Tall

Brewing Quality

An excellent general purpose hop with medium and well balanced bittering potential and a very deep fruity aroma. Gives great depth of character with a strong hop/fruit aroma.

Origin

Not known but possibly the result of a cross between an English variety and an American male hop. The standard US cultivar, improved by mass selection in the mid 1960s.

Agronomics

Medium compact cone maturing early to late season. Very susceptible to Downy Mildew but not seriously affected by Prunus necrotic ring-spot virus. Plentiful Lupulin.

Year	Hectares	Zentners	ZTR/Ha	Alpha%
1997	1789	76040	42.50	7.6
1998	1320	53179	40.29	6.8
1999	703	29311	41.69	7.5
2000	460	20502	44.57	7.9
2001	311	12783	41.10	7.5
		Avg	42.03	7.5

Analytical Information

Oil Composition

Alpha Acid %	6-9	Myrcene	45-55 %
Beta Acid %	4.5-5.5	Caryophyllene	6-7 %
Co-humulone (%A.Acid)	36-42	Farnesene	<1 %
Total Oil %	0.4-0.8	Humulene	15-18 %
		Storageability	80-85 %



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USA

COLUMBUS (TOMAHAWK) Tall

Brewing Quality Generally used for main copper hop in the form of extracts and pellets because of the exceedingly high alpha. Have shown to be very aromatic as late hops in cask ales.

Origin Three hop varieties with very high alpha properties were all produced at the same time (the two above plus Zeus) and sold to different grower groups. Since then it has been proven that Columbus and Tomahawk are the same variety (by gas chromatograph) and Zeus is so similar that it is indistinguishable from the other two in the finished product! These hops have taken the USA by storm and acreage of all other US varieties seem to be suffering because of it. They are all labeled as Super High Alpha.

Agronomics High yielding and high alpha with generally good resistance to all pests and disease although these varieties are showing signs of susceptibility to Powdery Mildew.

Year	Hectares	Zentners	ZTR/Ha	Alpha%
1998	1618	90325	55.83	14.5
1999	1770	96424	54.48	14.0
2000	1861	106849	57.41	
2001	1991	111159	55.83	
		Avg	55.89	14.3

Analytical Information

Alpha Acid % 14-17



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CRYSTAL

Tall

Brewing Quality Used for its aromatic properties

Origin Crystal is a triploid aroma-type cultivar, released for commercial production in 1993. It originates from a seedling selection (No. 8309-37) made at Corvallis in 1983 between the colchicine – induced tetraploid “Hallertau Mittelfrüher” (USDA 21397) and the diploid male downy mildew resistant aroma hop, USDA 21381 M. Crystal is half sister of Mt Hood and Liberty.

Agronomics Tolerant to downy mildew, with good pickability of a small cone.
Maturity: Medium-late
Yield: 1400-1700kgs per ha.
(1200-1500lbs per acre)

Analytical Information Oil Composition

Alpha Acid %	4.0-6.0	Myrcene	40-65 %
Alpha/Beta Ratio	0.8:1	Caryophyllene	4-8 %
Beta Acid %	5.0-6.7	Farnesene	0.1 %
Co-humulone (%A.Acid)	20-22	Humulene	18-24 %
Total Oil %	0.8-2.1	Storageability	Poor %



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GALENA

Tall

Brewing Quality

Galena is generally perceived as an excellent high alpha hop with balanced bittering potential. The very strong tomcat / blackcurrant aroma characteristics are similar to that of the old Bullion variety which for many years was used in Guinness. A very strong fruity character can be achieved with this variety.

Origin

The Galena cultivar was selected from an open pollinated cross from Brewers Gold, it is a bitter variety that was developed in Idaho in the late 1970s. Released in 1978 it is now a major U.S. High Alpha hop.

Agronomics

Galena is a fair yielding bitter variety that matures mid-season. It is grown in Washington, Idaho and Oregon. It is moderately susceptible to Downy Mildew and is susceptible to Prunus necrotic ring spot virus. Aphid and mite control can become a problem with this variety.

Year	Hectares	Zentners	ZTR/Ha	Alpha%
1995	3628	158286	43.63	11.8
1996	3494	158940	45.49	12.3
1997	3086	125074	40.53	11.8
1998	2635	97251	36.91	11.9
1999	2390	105826	44.28	12.5
2000	2260	95339	42.19	13.2
2001	1996	74110	37.13	12.4
		Avg	41.45	12.3

Analytical Information

Oil Composition

Alpha Acid %	12-14	Myrcene	55-60 %
Alpha/Beta Ratio	1.7:1	Caryophyllene	3-5 %
Beta Acid %	7.0-9.0	Farnesene	>1 %
Co-humulone (% A. Acid)	32-42	Humulene	10-15 %
Total Oil %	0.9-1.2	Storageability	75-80 %



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HORIZON

Tall

Brewing Quality

Used for its aromatic and bittering properties due to its low cohumulone content. Storage is fair to good.

Origin

Horizon is a high alpha-aroma cultivar, a diploid seedling result of a cross made in 1970 between the USDA 65009 female plant (with Brewers Gold and Early Green lineage) and the male plant 64035M. It was released as a commercial variety in 1998.

Agronomics

Susceptible to downy mildew, with good pickability of a small, compact cone.
Maturity: Medium
Yield: 2100 – 2300kg per ha.
(1900 – 200lbs per acre)

Year	Hectares	Zentners	ZTR/Ha	Alpha%
2001	137	3764	27.47	
		Avg	27.47	

Analytical Information

Oil Composition

Alpha Acid %	10-16.5	Myrcene	65-70 %
Alpha/Beta Ratio	1.6:1	Caryophyllene	5-6 %
Beta Acid %	6.5-8.5	Farnesene	2 %
Co-humulone (%A.Acid)	17-22	Humulene	8-10 %
Total Oil %	1.2-2.6		



Charles Faram and Co Ltd

www.charlesfaram.co.uk
email: enquiry@charlesfaram.co

Tel: 01905 830734
Fax: 01905 831790

USA

LIBERTY

Tall

Brewing Quality

Liberty has many similarities to the Hallertauer Mittlefruh. The cones contain a moderate amount of lupulin that is a light yellow colour. The aroma is mild and clean. Liberty has shown many similarities to a Golding hop but has just a hint of lemon/citrus flavour that gives it an extra edge on the smooth Golding flavour.

Origin

Liberty is a relatively new American aroma hop. Originating from a cross made in 1983, it is a triploid seedling of the Hallertauer Mittlefruh. It was released as a variety in 1991.

Agronomics

Liberty is a low-to-medium yielding, seedless aroma variety that matures early to mid-season. Most of the cultivated acreage is in Washington and Oregon. It is moderately resistant to downy mildew and except for slight infection by hop mosaic virus, it has remained free of major hop viruses. It is sensitive to spider mites and aphids.

Year	Hectares	Zentners	ZTR/Ha	Alpha%
1995	56	1515	27.05	
1996	38	853	22.45	
		Avg	24.75	

Analytical Information Oil Composition

Alpha Acid %	3-6	Myrcene	32-42 %
Beta Acid %	3.0-4.0	Caryophyllene	9-12 %
Co-humulone (%A.Acid)	24-28	Farnesene	<1 %
Total Oil %	0.7-1.22	Humulene	30-40 %
		Selinene	55-60 %



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MOUNT HOOD

Tall

Brewing Quality Mount Hood is generally perceived as an aroma variety with similar characteristics to the German Hallertauer Mittlefruh and Hersbrucker varieties. The cones contain a moderate amount of lupulin that is yellow in colour. The aroma is generally pleasant, mild and herbal. In British style ales the flavour comes through as delicate, floral and slightly herbal

Origin The Mount Hood cultivar is an aroma variety that was developed in Oregon in the late 1980s. It is a triploid seedling of the Hallertauer variety. It was selected from a cross between the tetraploid Hallertauer Mittlefruh and an aroma type male.

Agronomics Mount Hood is a good yielding aroma variety that matures early to mid-season. It is now grown commercially in Washington, Oregon and Idaho. It is somewhat tolerant to Downy Mildew. Aphids and spider mite control is not a serious problem with this variety.

Year	Hectares	Zentners	ZTR/Ha	Alpha%
1995	567	19833	34.98	3.8
1996	483	15258	31.59	4.3
1997	319	10177	31.90	4.8
1998	241	6591	27.35	4.0
1999	271	8263	30.49	5.0
2000	271	8840	32.62	4.3
2001	2525	8355	3.31	4.6
		Avg	27.46	4.4

Analytical Information Oil Composition

Alpha Acid %	3.0-6.0	Myrcene	55-65 %
Beta Acid %	5.0-7.5	Caryophyllene	7-10 %
Co-humulone (%A.Acid)	22-23	Farnesene	<1 %
Total Oil %	1.0-1.3	Humulene	15-25 %
		Selinene	50-60 %



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NUGGET

Tall

Brewing Quality A high alpha acid hop with a good aroma profile.

Origin Selected from a cross between Brewers Gold and a high alpha male with good storage properties. Released in 1982 it is now a major high alpha variety in the USA

Agronomics Heavy cone structure maturing mid-season. Little visual reaction to infection with ring-spot virus
Moderate to good resistance to Downy Mildew

Year	Hectares	Zentners	ZTR/Ha	Alpha%
1995	3318	159215	47.99	
1996	3511	140552	40.03	
1997	3488	162398	46.56	
1998	2956	111082	37.58	12.5
1999	2604	123914	47.59	13.0
2000	2825	123811	43.83	13.6
2001	2605	124402	47.76	13.4
		Avg	44.47	13.1

Analytical Information Oil Composition

Alpha Acid %	11.0-15.0	Myrcene	51-59 %
Beta Acid %	4.0-6.0	Caryophyllene	7-10 %
Co-humulone (%A.Acid)	24-30	Farnesene	<1 %
		Humulene	12-22 %
		Selinene	n/a %



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SANTIAM

Tall

Brewing Quality

Origin

A new aroma cultivar with a good yield, it was released by USDA in 1998. It is a triploid hop resulting from a cross between the German Tettmanger and a selected triploid male with a Hallertauer MF.

Agronomics

Santium matures early to mid season, yielding 1600-2000 kg per ha. It is moderately resistant to downy mildew.

Year	Hectares	Zentners	ZTR/Ha	Alpha%
2000	7	204	29.14	
		Avg	29.14	

Analytical Information

Oil Composition

Alpha Acid %	5.5-7.0	Myrcene	30-45 %
Beta Acid %	7.0-8.5	Caryophyllene	5-8 %
Co-humulone (%A.Acid)	20-22	Farnesene	13-16 %
Total Oil %	1.3-1.7	Humulene	20-25 %



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WILLAMETTE

Tall

Brewing Quality

Willamette is generally perceived as a new, yet good quality aroma hop. The rub of the hops give an estery/blackcurrant/herbal aroma that is very pleasant but can be quite strong. Differing results have been achieved with this variety. Some brewers have found it to be a suitable replacement for Fuggle, others have had poor results when using it this way but have found that it stand up admirably as an aroma variety on its own merits.

Origin

The Willamette cultivar is an aroma variety that was developed in Oregon in the early 1970s. It is a triploid seedling of the Fuggle variety.

Agronomics

Willamette is a moderate yielding aroma variety that matures early to mid-season. Most of the U.S. acreage is in Oregon and Washington. It is somewhat tolerant to downy mildew and has shown good resistance to Prunus necrotic ring-spot virus. Aphid and spider mite controls are not major problem with this variety.

Year	Hectares	Zentners	ZTR/Ha	Alpha%
1995	2451	87525	35.71	
1996	2743	76226	27.79	4.7
1997	3066	101098	32.97	4.2
1998	2605	74952	28.77	4.3
1999	2401	76762	31.97	5.5
2000	2390	77148	32.28	4.7
2001	2519	75928	30.14	4.8
		Avg	31.38	4.7

Analytical Information

Oil Composition

Alpha Acid %	3-6	Myrcene	45-55 %
Beta Acid %	3.0-4.0	Caryophyllene	7-8 %
Co-humulone (%A.Acid)	30-35	Farnesene	5-6 %
Total Oil %	1.0-1.5	Humulene	20-30 %