


Hop Varieties U.S. Grown



A Tradition of Trust

Joh. Barth & Sohn 

Comparative Data of Thirteen U.S. Grown Hop Varieties

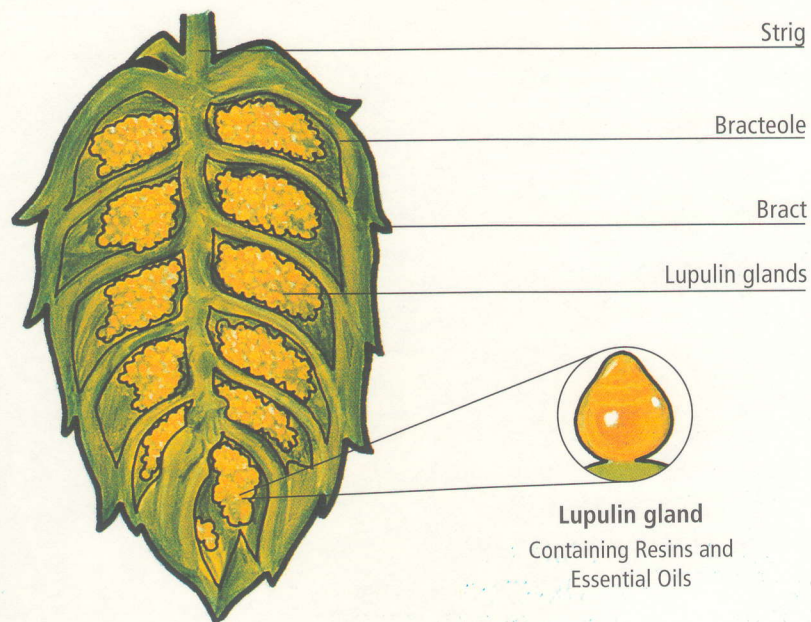
Brewers around the world enjoy the benefits of U.S. grown hop varieties, thirteen of which are highlighted in this brochure. It presents the most important varieties and provides a summary of their main characteristics.

Development of new commercial varieties, requiring ten or more years, is a long-term investment and commitment to the brewing industry. In addition to USDA breeding programs, private companies have also been working diligently to improve the characteristics of existing varieties, resulting for example in the commercial release of Chelan, Tillicum and Symphony.

All physical and analytical data presented are based on long-term averages and may vary from year to year.

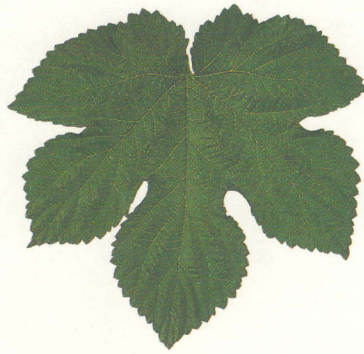
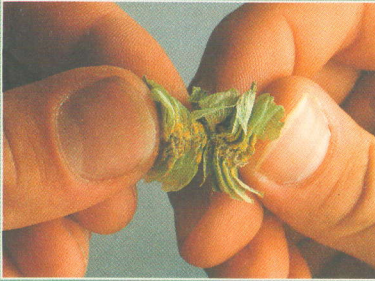
Please do contact us for more information or samples. All varieties can be supplied in form of raw hops, pellets type 90 and 45 or CO₂ extract.

Cross-section of a hop cone



The analytical values indicated are based on long-term averages. They are typical for each variety at harvest time but can vary among crop years, growing areas, growers, and with aging after harvest.

Myrcene values are not indicated because of great range in values due to variations in handling of hops.



..... Golding

Goldings consist of a group of traditional English aroma varieties which has been cultivated since the late 18th century with the original Golding dating back to 1790. Several selections now exist including Cobbs, Early Bird, East Well, Bramling, Canterbury and Mathon, some of which are now being grown in the U.S. All Goldings are recognized as having a most typical English aroma.



..... Mt. Hood

Mt. Hood is an aroma variety released in 1989 from the U.S.D.A. breeding program in Oregon. The variety is a triploid daughter of Hallertauer mittelfrueh and a sister to Liberty with analytical data similar to both. It has a low alpha acids and beta acids content, low cohumulone content in the alpha acids, high humulene content in the essential oil and a mild aroma.

Analytical Data

	1.450	1.550
Yield in kg per hectare	1.450	1.550
Maturity	medium	medium
Main Growing Areas	Washington/Oregon	Washington/Oregon
Alpha Acids (EBC 7.7)	5,1 %	3,6 %
Beta Acids	2,4 %	4,3 %
Alpha:Beta Ratio	2,1	0,8
Humulone*	70-74 %	76-79 %
Cohumulone	26-30 %	21-24 %
Total Oils in ml per 100 grams	0,6-0,9	1,4-1,7
Humulene	38-45 %	15-34 %
Caryophyllene	12-17 %	7-14 %
Humulene/Caryophyllene Ratio	2,7-3,1	2,0-2,5
Farnesene	0 %	0 %

*Humulone values include adhumulone which could be 5 -10 % of total.

Aroma Varieties



Tettnanger

Tettnanger is an old aroma variety originating in the Tettngang area around Lake Constance in Southern Germany. Selection of Tettnanger rootstocks in Germany resulted in two different rootstocks now available to U.S. growers. Each produces hops with distinct analytical data.

1.250

early

Washington/Oregon/Idaho

4,1 %

2,3 %

1,8

69-73 %

27-31 %

0,6-0,8

18-25 %

6-10 %

2,7-3,3

7-12%



Fuggle

Fuggle originated in England about 1861 and was introduced into the U.S. before 1900. It is a popular aroma variety in England and has been popular in the U.S. where it has largely been replaced by its triploid daughter Willamette. Fuggle is characterized by low alpha acids content, mild aroma and low yields. Maturity is early and resistance to downy mildew is good.

1.350

early

Washington/Oregon

4,1 %

2,7 %

1,5

72-77 %

23-28 %

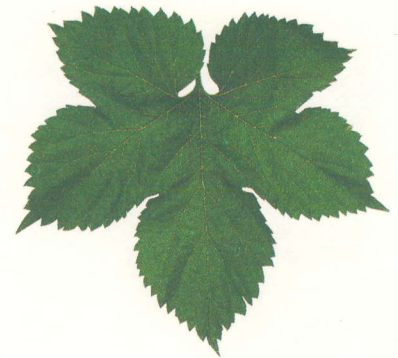
0,7-1,0

20-26 %

6-10 %

2,6-3,3

3-7 %



Willamette

Willamette, the triploid daughter of Fuggle, was released as a U.S. aroma variety in 1976 from the U.S.D.A. breeding program in Oregon. The variety is characterized by a low alpha acids content, mild aroma similar to Fuggle and medium cone yields. It is more difficult to grow than most varieties, however, it is still widely grown in all U.S. growing areas where it has largely replaced Fuggle.

1.650

medium

Washington/Oregon/Idaho

5,4 %

3,6 %

1,5

68-72 %

28-32 %

1,0-1,3

20-30 %

6-9 %

3,0-3,8

4-8 %



Cascade

Cascade was developed in the U.S.D.A. breeding program in Oregon and released as a U.S. aroma variety in 1972. It is characterized by a dark green elongated cone which contains low amounts of alpha acids. The aroma is of medium strength and very distinct. The variety has good cone production and is agronomically strong with good crown resistance to downy mildew.



Cluster

Cluster is the oldest variety grown in the U.S. Origin of the rootstock is uncertain. Until the late 1970's it was one of only a few varieties growing in the U.S. and was planted to most of the hop acreage. Alpha acids content is medium, aroma is strong and storage stability of the alpha acids is among the best in the world. The variety grows with good vigor and cone production.



Chinook

Chinook was developed by the U.S.D.A. breeding program in Washington State and released in 1985 as a high alpha acids variety. The female parent is one of the English Goldings. The variety grows vigorously in all growing areas and yields best in the Yakima area. Alpha acids content is high while beta acids content is low compared to other high alpha acids varieties. Aroma strength is medium and storage stability is fair.

2.000	2.150	2.150
medium	early/late	medium
Washington/Oregon/Idaho	Washington//Idaho	Washington/Idaho
5,8 %	6,3 %	11,7 %
6,1 %	4,2 %	3,2 %
0,9	1,5	3,6
62-66 %	56-61 %	65-69 %
34-38 %	39-44 %	31-35 %
0,9-1,2	0,4-0,7	1,8-2,4
10-16 %	15-18 %	20-25 %
3-6 %	5-8 %	8-12 %
2,5-3,0	2,3-2,7	2,0-2,4
4-8 %	0 %	0 %



Nugget

Nugget is a high alpha acids variety released in 1983 from the U.S.D.A. breeding program in Oregon. It is characterized by mild aroma, a low proportion of cohumulone in the alpha acids and good storage stability. Nugget is less sensitive to downy mildew than is Galena. It grows vigorously in all areas where it generally yields well, however it is subject to occasional wide fluctuations in yield.



Galena

Galena is a high alpha acids variety developed in the state breeding program in Idaho and released as a variety in 1978. The female parent is Brewers Gold. Galena is characterized by high alpha acids and a relatively high content of beta acids. Storage stability is nearly as good as for Cluster. The variety is particularly sensitive to downy mildew, day length and climatic conditions and therefore yields best in the Washington growing areas.

Analytical Data

Yield in kg per hectare	2.250	2.150
Maturity	late	medium
Main Growing Areas	Washington/Oregon	Washington/Idaho
Alpha Acids (EBC 7.7)	11,7 %	11,4 %
Beta Acids	4,5 %	7,2 %
Alpha:Beta Ratio	2,6	1,6
Humulone*	70-76 %	60-64 %
Cohumulone	24-30 %	36-40 %
Total Oils in ml per 100 grams	1,5-1,9	0,9-1,2
Humulene	17-30 %	10-16 %
Caryophyllene	8-16 %	3-9 %
Humulene/Caryophyllene Ratio	1,9-2,2	1,6-2,2
Farnesene	0 %	0 %

*Humulone values include adhumulone which could be 5-10 % of total.

Bitter Varieties



Chelan

Chelan is a high alpha acids variety with a very high percentage of beta acids. The variety was developed through a private company's breeding program and released in 1994. It is a daughter of Galena and a full sister to Tillicum and therefore has analytical data similar to these varieties. Cone yields and percentages of alpha acids are higher than for Galena, maturity is medium as in Galena and storage is excellent.

2.450

medium

Washington

12,0 %

8,6 %

1,4

63-67 %

33-37 %

1,2-1,6

12-19 %

9-15 %

1,2-1,7

0 %



Tillicum

Tillicum is a high alpha acids variety with a very high content of beta acids. The variety was developed through a private company's breeding program and released in 1995. It is a daughter of Galena and a full sister to Chelan and therefore has analytical data similar to both varieties. Tillicum differs from Chelan by its early harvest maturity and is the earliest ripening high alpha acids variety in the U.S.

2.250

early

Washington

12,0 %

8,6 %

1,4

63-66 %

34-37 %

1,3-1,7

12-20 %

6-12 %

1,8 - 2,3

0 %



Super High Alpha

The current Super High Alpha varieties, which include the names Columbus, Tomahawk and Zeus have mature yields in excess of 3000 kgs/hectare, an alpha acids content greater than 13.0% but poor storage stability of their alpha acids, the poorest of all commercial high alpha varieties. Due to their downy mildew sensitivity, commercial plantings are primarily found in growing areas where this disease is not a problem.

> 3.000

late

Washington

13,5 %

4,0 %

3,4

70 %

30 %

2,5

15 %

10 %

1,5

0 %

Major U.S. Growing Areas



Hop Growing Areas

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