



BarthHaas®

**HOP
HARVEST
GUIDE
2019**



*Inspiration and knowledge
for the best beers*

Hop Harvest Guide 2019

*the guide to wonderful beers
with hops from the 2019 harvest*



Every beer tells a story

This sentence perfectly summarises our fascination with hop-forward beers and their stories. The Hop Harvest Guide 2019 is the beginning of a new chapter.

The diversity of the past harvest year promises exciting aromas, unique varietal characteristics and breath-taking hop highlights. All the ingredients you need for a successful beer story.

Please keep turning the pages to discover new inspirations for your flavor creations! Enjoy this guide. Yours,

A handwritten signature in black ink, appearing to read 'C. Schönberger', written in a cursive style.

Dr. Christina Schönberger

Hop Harvest Guide 2019

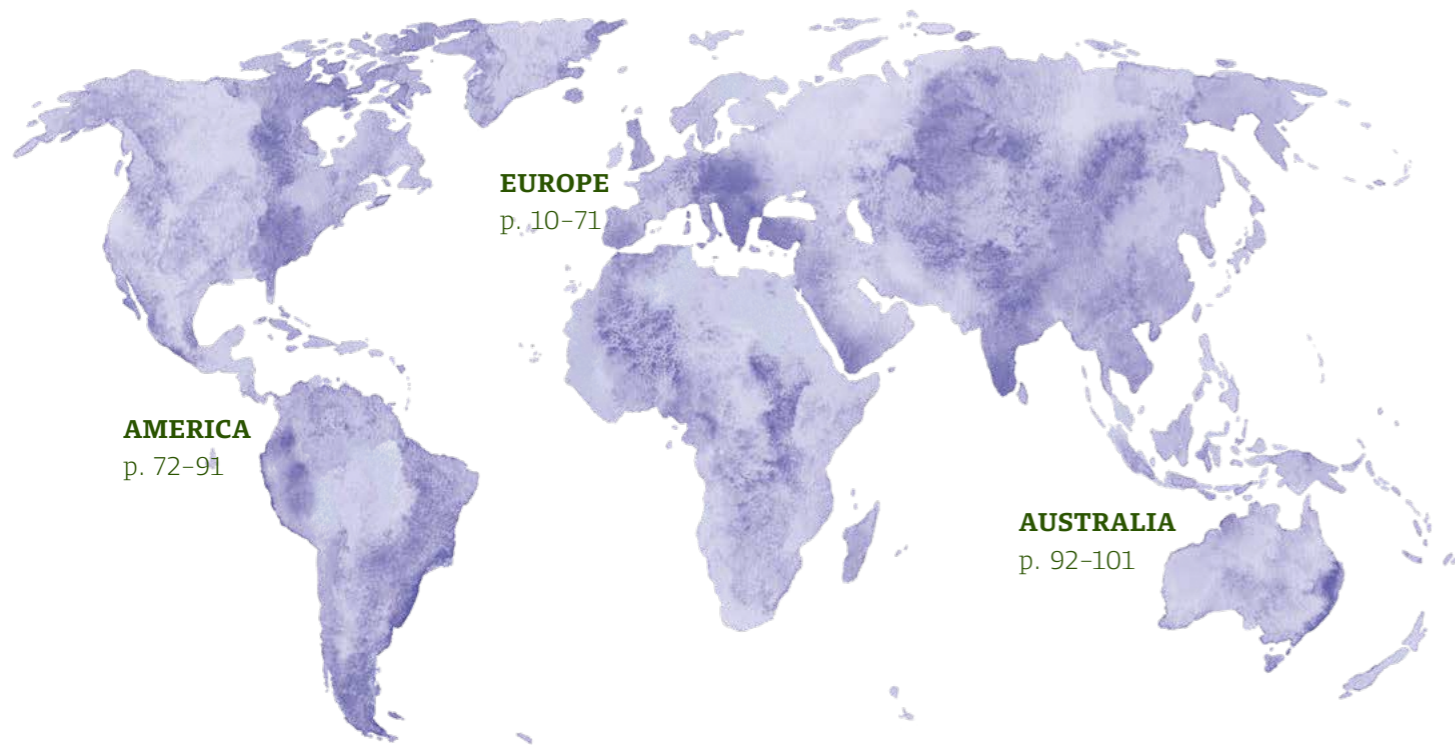


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Hop oils make up only a small proportion of hops, but they play a key role in bringing hoppy aromas and flavors to beer. Different hop flavor compounds can impart floral, spicy, herbal, woody, citrusy or fruity notes.

Selected hop varieties from the 2019 harvest were analysed for major hop flavor compounds to highlight each variety's specific character.

% Total Oil	Myrcene	Humulene	Caryophyllene	Farnesene	Linalool	Geraniol	Terpene alcohols & esters	Ketones	Isobutyrate	Thiols [µg/kg]
Hallertau Callista	46,96	17,31	4,42	0,12	1,19	0,04	1,10	0,81	0,90	8,62
Hallertau Ariana	44,95	18,13	4,84	0,02	0,36	0,13	2,77	3,26	1,99	10,35
Hallertau Perle	27,32	41,37	12,80	0,01	0,15	0,05	1,37	0,74	0,87	0,00
Hallertau Hal. Tradition	35,51	34,97	9,44	0,06	0,81	0,03	1,08	1,05	0,78	0,00
Hallertau Mandarina Bavaria	32,84	13,86	3,74	1,29	0,22	0,26	1,34	0,79	1,48	7,14
AU - Galaxy®	45,25	1,17	9,04	3,41	0,50	0,12	1,56	5,25	3,66	10,33
AU - Vic Secret	52,87	10,91	8,75	0,01	0,40	0,09	0,86	4,42	3,92	24,14
US - Citra®	61,98	10,76	6,61	0,05	0,72	0,22	2,09	1,12	0,53	28,74
US - Mosaic®	56,14	13,80	5,45	0,04	0,50	0,67	2,31	3,85	1,36	26,24
US - Sabro™	52,09	11,63	17,20	0,77	0,48	1,34	0,66	0,92	1,57	21,96

Representative analysis of flavor compounds

MYRCENE is a terpene and the main hop oil component in most hop varieties. It is responsible for a green, hoppy aroma. However, its low solubility and high volatility mean that only small amounts are transferred into and retained in beer, primarily when dry hopping.

HUMULENE, CARYOPHYLLENE and **FARNESENE** are the main sesquiterpenes in hop oil. They impart herbal, woody, spicy, and sometimes citrusy or floral aromas. Like myrcene, they are present in beer only in low concentrations due to their low solubility and high volatility. The ratio of caryophyllene to humulene and the presence or absence of farnesene are considered characteristic markers for different hop varieties.

LINALOOL and **GERANIOL** are the two most abundant **TERPENE ALCOHOLS** in hops. Terpene alcohols are more soluble than terpenes or sesquiterpenes and thus play a major role in both late

hop and dry hop aroma. Linalool is generally described as floral and citrusy, reminiscent of lavender or bergamot, and geraniol as floral with a hint of citrus, rose or geranium. Other terpene alcohols and **TERPENE ESTERS** can impart floral, woody, or spicy notes.

Hop **KETONES** and **ISOBUTYRATES** also show good solubility and impart fruity, sometimes waxy notes, contributing to banana or pineapple flavors.

THIOLS, specifically 4-mercapto-4-methylpentan-2-one (4MMP), 3-mercaptohexan-1-ol (3MH), and 3-mercaptohexyl acetate (3MHA), are present only in very small concentrations in hops but due to their extremely low sensory detection thresholds, they can have a major impact on hop aroma perception. 4MMP is usually described as tasting of blackcurrant or ribes or, to some people, "catty", while 3MH and 3MHA impart tropical notes of passion fruit or guava.

HOPSESSED® CATEGORY DESCRIPTION

The 12 aroma categories and associated aromas allow you to define your unique aroma profile.

- | | | | |
|--|---|---|--|
| <p>citrus
grapefruit, orange, lime, lemon, bergamot, lemon-grass, ginger, tangerine, pomelo</p> | <p>green fruits
pear, apple, quince, goose-berry, white wine grapes</p> | <p>menthol
mint, lemon balm, sage, camphor, menthol, wine yeast, eucalyptus</p> | <p>vegetal
celery, leek, onion, artichoke, garlic, wild garlic, radish</p> |
| <p>cream caramel
butter, chocolate, yogurt, honey, cream, caramel, toffee, coffee, tonka bean, vanilla, coconut</p> | <p>woody aromatic
tobacco, cognac, barrique, leather, woodruff, incense, myrrh, resin, cedar, pine, earthy</p> | <p>berries & currant
cassis, blueberry, raspberry, blackberry, strawberry, redcurrant, blackcurrant, wild strawberry, cranberry, mulberry</p> | <p>grassy-hay
fresh cut grass, hay, tomato leaves, green pepper, nettle, cucumber, bamboo leaves</p> |
| <p>sweet fruits
banana, watermelon, honeydew melon, peach, apricot, passion fruit, lychee, dried fruit, plum, pineapple, cherry, kiwi, mango, guava</p> | <p>herbal
marjoram, tarragon, dill, parsley, basil, fennel, cilantro, rosemary, thyme, green tea, black tea, mate tea, oregano</p> | <p>floral
elderflower, camomile blossom, lily of the valley, jasmine, apple blossom, rose, geranium, carnation, lily, lilac, lavender, osmanthus</p> | <p>spicy
lovage, pepper, chili, curry, juniper, aniseed, liquorice, fennel seeds, clove, cinnamon, gingerbread, coriander seeds, nutmeg</p> |

HOPSESSED® KEY FLAVORS

Find the perfect hops for your new taste vision, such as:

Grapefruit

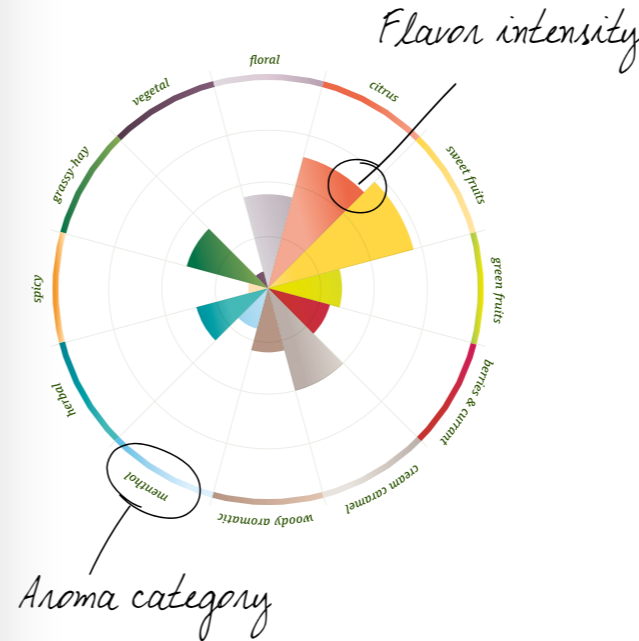
Grapes

Tangerine



HOPSESSED® ROSECHART

The right flavor at a glance: We have visualized the new sensory language for you. Our Hop Navigator will guide you easily and quickly.



HOPSESSED®

The language of hops

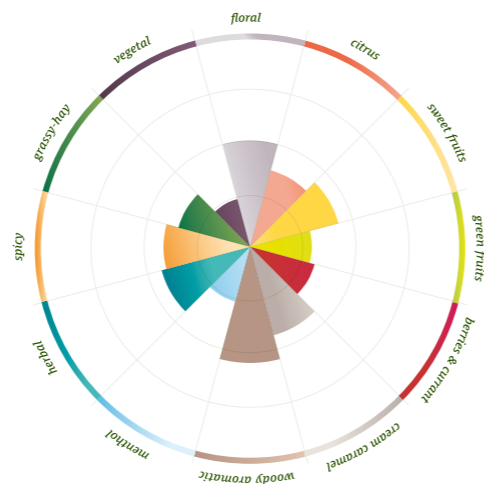
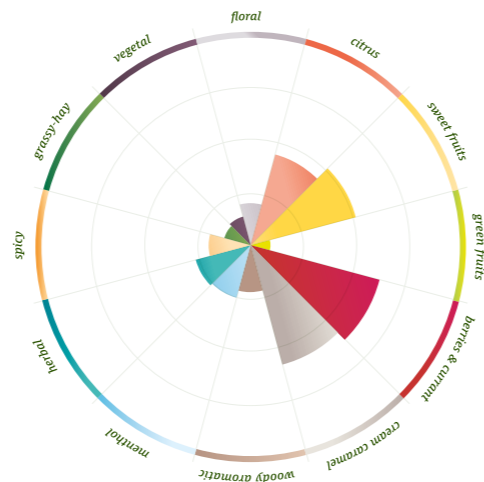


CROP 2019

This crop shows strong cream and vanilla flavors in the cones, complemented by refreshing orange type flavors and rose and camomile aromas. Hay aroma and barrique flavors balance out the overall impression.

AROMA CHARACTERISTICS

This variety has a sweet fruity bouquet of strawberries, raspberries and pineapple with an undercurrent of cognac notes, rose and lemon balm.



The most important traditional aroma hop variety in Alsace is Strisselspalt. Aramis was developed in a hop breeding programme to provide similar aromas but higher alpha and oil contents.

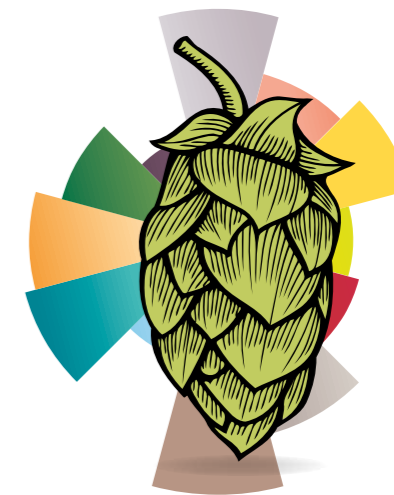
ANALYSIS DAUGHTER OF STRISSELSPALT

Growing area	France
Heritage	Daughter of Strisselspalt
Alpha Acids*	7,9 - 8,3 %
Total Polyphenols	3,6 - 5,1 %
Myrcene	40,0 % Total Oils
Beta Acids	3,8 - 4,5 %
Total Oil	1,2 - 1,6 ml/100 g
Linalool	no data

* The alpha content is determined by means of spectrophotometric analysis.

Aramis

France



Key Flavors

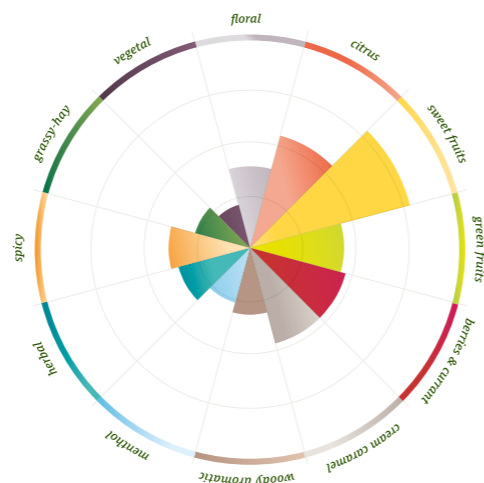
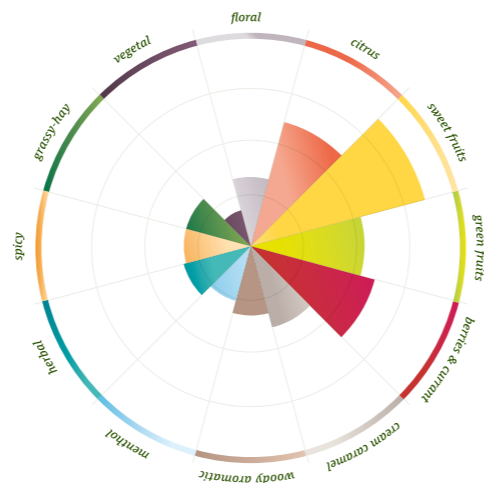


CROP 2019

A true fruit salad is presented in Ariana of crop 2019. Next to strong passion fruit and pineapple flavors, tangerine, jasmine and eucalyptus aroma round off the overall impression.

AROMA CHARACTERISTICS

A veritable multi-fruit cocktail of orange juice, watermelon, banana, mango, quince, strawberry and blackberry. The raw hop aroma is clearly dominated by sweet fruits and berries. The flavor profile is rounded off with a note of green peppers.



This cross of the well-known variety **Herkules** with a wild male variety was named **2010/72/20** during the testing period at the Hop Research Center in Hüll. Since its baptism, it bears the name **Ariana** and provides a wonderful aroma of sweet fruits to various beer styles.

ANALYSIS VALUES

Growing area	Germany
Heritage	Herkules x wild male variety
Alpha Acids*	10,0 - 13,0 %
Total Polyphenols	3,3 %
Myrcene	57,6 % Total Oils
Beta Acids	4,5 - 6,0 %
Total Oil	1,6 - 2,4 ml/100 g
Linalool	0,5 % Total Oils

* The alpha content is determined by means of spectrophotometric analysis.

All values for Ariana from the representative flavor component analysis can be found on pages 6 - 7



Ariana

Germany



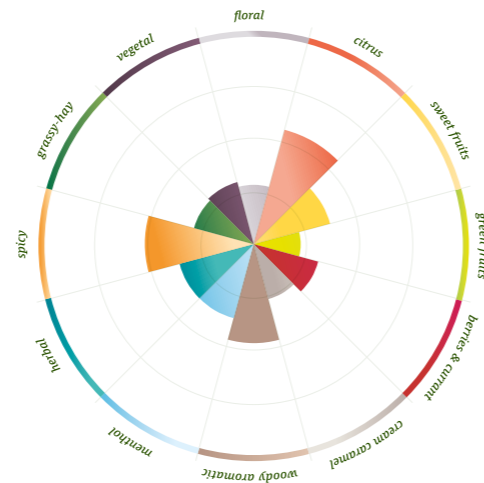
Key Flavors





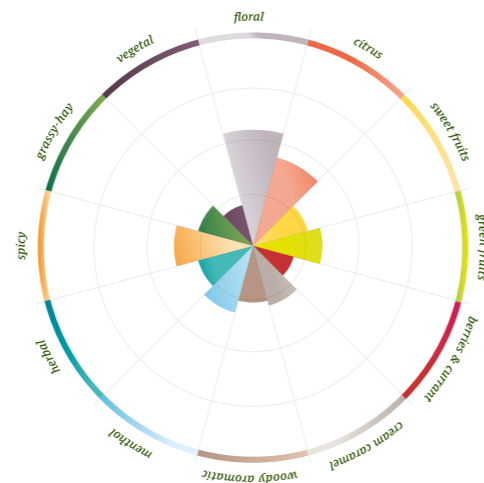
CROP 2019

The cone hops can be characterised by citrus fruits such as lemon zest and lemongrass. Additionally, herbal notes such as marjoram and fennel play an important part. Nettle and grassy notes complement the flavor profile of crop 2019.



AROMA CHARACTERISTICS

Aurora's appeal lies in its exceptionally spicy notes. In its raw state, it is characterised by spicy-herbal aromas of lovage, marjoram, lavender and aniseed, pleasantly rounded off by the fruitiness of lime and mandarin orange as well as resinous, woody notes of incense.



Aurora is the Latin word for dawn. This cultivar used to be called Super Styrian and is derived from Northern Brewer. It has a rich green color, an intense, pleasantly hoppy aroma and has outstandingly good storage stability.

ANALYSIS DAUGHTER OF NORTHERN BREWER

Growing area	Slovenia
Heritage	Daughter of Northern Brewer
Alpha Acids*	7,0 - 9,0 %
Total Polyphenols	no data
Myrcene	35,0 - 53,0 % Total Oils
Beta Acids	3,0 - 5,0 %
Total Oil	0,9 - 1,4 ml/100 g
Linalool	no data

* The alpha content is determined by means of spectrophotometric analysis.

Aurora

Slovenia



Key Flavors



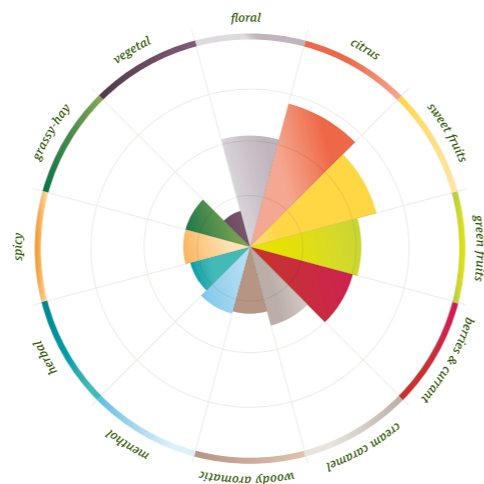
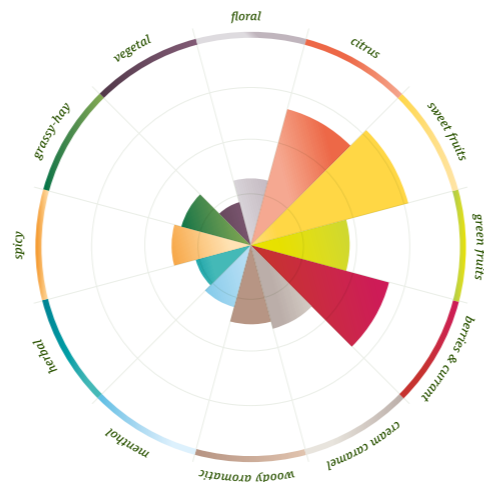


CROP 2019

The young variety Callista conjures up a very special fruit cocktail for crop 2019. The raw hop aroma is a mix of sweet citrus notes combined with passion fruit, strawberries and raspberries. This is rounded off with delicate notes of caramel.

AROMA CHARACTERISTICS

The raw hop aroma is a mix of fruits and berries including mango, pineapple, lemon, gooseberry, blackberry, strawberry and blackcurrant. This is rounded off with juniper, adding a delicately spicy element.



Callista is a daughter of the well-known variety Hallertau Tradition and carries very beautiful big hop cones. It is named after one of Jupiter's moons and can be used in many beer styles with its impressive fruity and harmonious notes.

ANALYSIS HÜLL MALE BREEDING LINE

Growing area	Germany
Heritage	Hallertau Tradition x wild male variety from Hüll
Alpha Acids*	2,0 - 5,0 %
Total Polyphenols	0,0 - 5,7 %
Myrcene	63,5 % Total Oils
Beta Acids	5 - 10 %
Total Oil	1,4 - 2,1 ml/100 g
Linalool	no data

* The alpha content is determined by means of spectrophotometric analysis.

All values for Callista from the representative flavor component analysis can be found on pages 6 - 7

Callista

Germany



Key Flavors



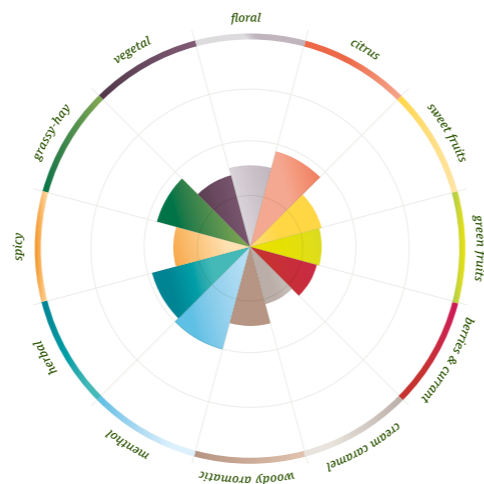
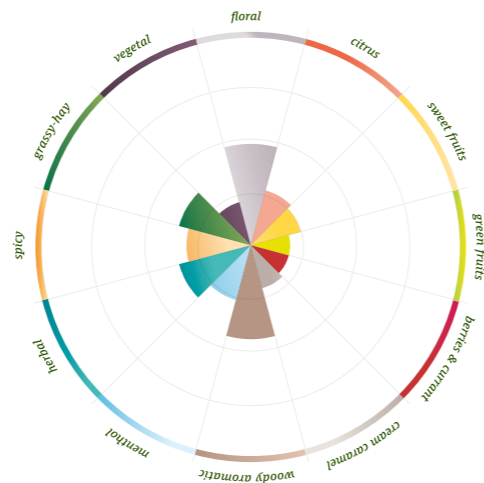


CROP 2019

Very strong woody and floral notes dominate the profile where normally herbal notes would prevail. Cedar and geranium are followed by thyme and basil. The profile is balanced by grassy notes like tomato leaves.

AROMA CHARACTERISTICS

Celeia presents predominantly savoury to cool aromas, such as peppermint, tarragon and thyme, with vegetal nuances.



This cultivar is grown mainly in Slovenia, but also in Styria/Austria. Celeia enjoys great popularity on account of its characteristic aroma and its moderate alpha values.

ANALYSIS DAUGHTER OF STYRIAN GOLDING

Growing area	Slovenia
Heritage	Daughter of Styrian Savinjski Golding
Alpha Acids*	3,0 - 6,5 %
Total Polyphenols	no data
Myrcene	26,0 - 40,0 % Total Oils
Beta Acids	2,0 - 3,3 %
Total Oil	1,5 - 3,6 ml/100 g
Linalool	0,6 - 1,2 % Total Oils

* The alpha content is determined by means of spectrophotometric analysis.

Celeia

Slovenia



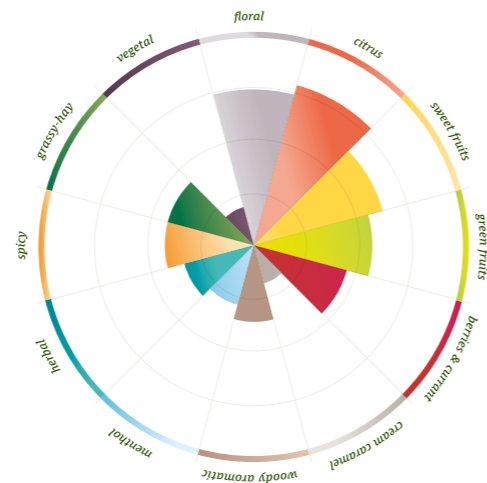
Key Flavors

- Lemon Tea
- Peppermint
- Thyme
- Lime



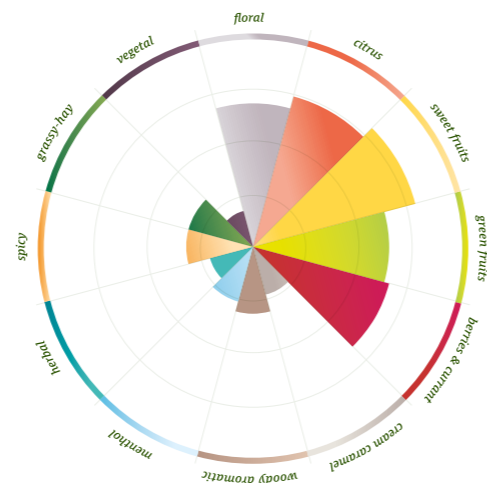
CROP 2019

As usual, Comet's profile is dominated by lemon and floral type notes but a lot of sweet fruits like pineapple, elderflower syrup and other berries are also part of the profile in 2019. The spicy and resinous flavors are present in the background. A further prominent flavor is gooseberries.



AROMA CHARACTERISTICS

In Comet, citrus, mandarin and lemongrass combine with floral geranium, green apple and resin components to form a remarkable flavor profile.



The hop cultivar Comet was bred as a high alpha variety for the states of Washington and Idaho. It is now only grown by a single hop grower in the Hallertau. It has unusually large cones and a characteristic elderflower aroma.

ANALYSIS OPEN POLLINATION

Growing area	Germany
Heritage	open pollination
Alpha Acids*	9,4 - 12,4 %
Total Polyphenols	no data
Myrcene	40,0 - 65,0 % Total Oils
Beta Acids	3,0 - 6,1 %
Total Oil	1,4 - 3,3 ml/100 g
Linalool	no data

* The alpha content is determined by means of spectrophotometric analysis.

Comet

Germany



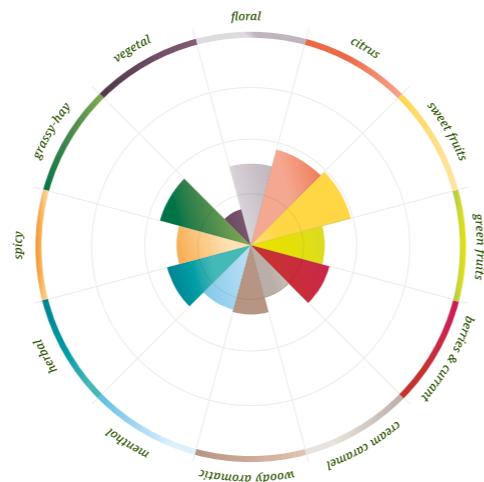
Key Flavors





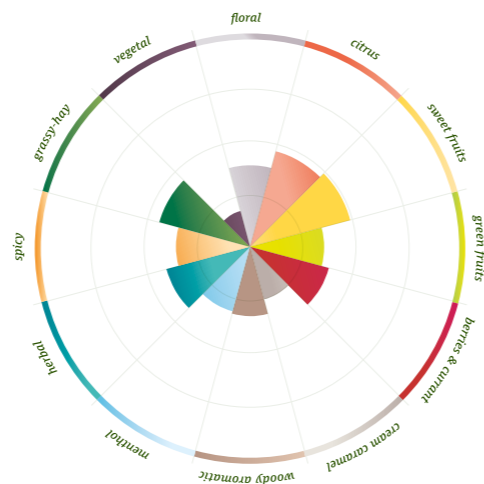
CROP 2019

This new variety from Hüll is blessed with basically all categories. Moderate fruit and citrus flavors, a bit of rose, some herbs and spices. A very balanced profile for 2019.



AROMA CHARACTERISTICS

This cultivar has sweet fruity aromas of wild strawberry and melon, rounded off with creamy notes of yogurt. Fruit tea, specifically peach tea, and herbaceous-spicy lemon balm, aniseed, lavender and geranium give it its special taste.



This hop is a further extension of the Saaz range with improved plant health and higher agronomic performance compared to the mother "Spalter". With its classic fresh, hoppy aroma profile, Diamant is particularly suitable for harmonious lager beers with a fine hop aroma.

ANALYSIS VALUES

Growing area	Germany
Heritage	Spalter x 80/18/62
Alpha Acids*	7,0 %
Total Polyphenols	4,9 %
Myrcene	53,0 % Total Oils
Beta Acids	6,3 %
Total Oil	1,7 ml/100 g
Linalool	1,3 % Total Oils

* The alpha content is determined by means of spectrophotometric analysis.

Diamant

Germany



Key Flavors

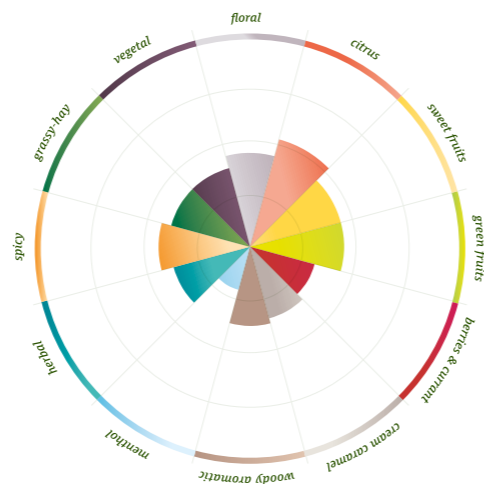
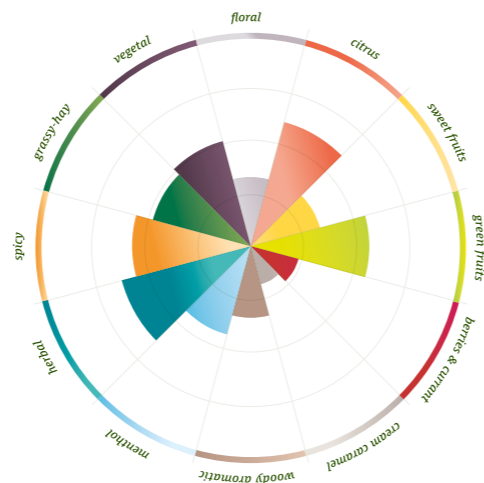
- Lavender
- Lemon
- Fennel

CROP 2019

This variety has a very balanced aroma profile, offering diversified aroma notes. Key elements of its typical profile are lemon type aromas, which are expressed nicely in crop 2019. Other more pronounced characteristics in this crop are herbal notes, such as green tea or black tea and spicy flavors.

AROMA CHARACTERISTICS

Extra Styrian Dana features prominent spicy-herbal notes of lovage and juniper, as well as pine. Combined with these aromas are delicate notes of green fruits, citrus-like green and vegetal elements, such as gooseberries, pear, lemon, thyme, orange and nettle.



Extra Styrian Dana

Slovenia

The aim of breeding this variety was to produce both bitterness and aroma. Extra Styrian Dana therefore provides intense hop aroma and robust bitterness.

ANALYSIS DAUGHTER OF HALLERTAU MAGNUM

Growing area	Slovenia
Heritage	Daughter of Hallertau Magnum
Alpha Acids*	12,5 - 18,8 %
Total Polyphenols	no data
Myrcene	42,0 - 60,0 % Total Oils
Beta Acids	4,2 - 6,0 %
Total Oil	2,4 - 3,9 ml/100 g
Linalool	0,5 - 1,0 % Total Oils

* The alpha content is determined by means of spectrophotometric analysis.



Key Flavors

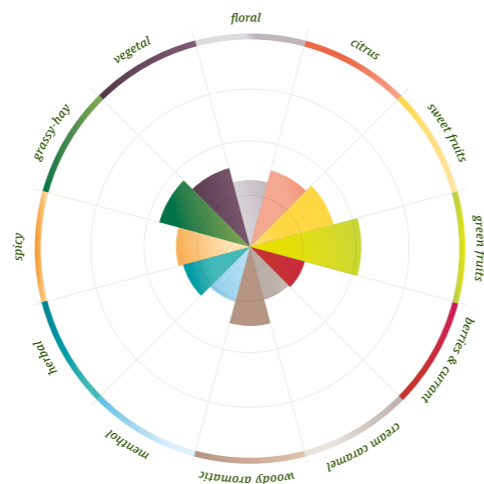
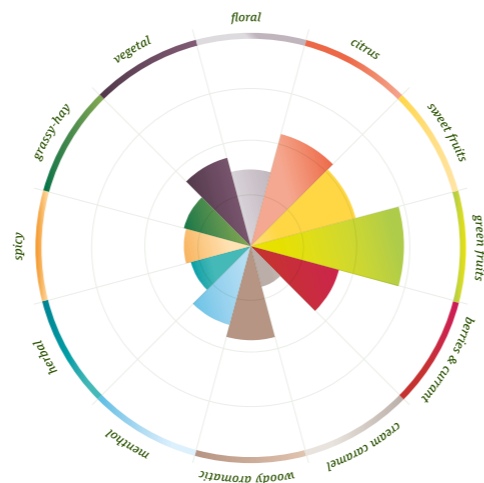


CROP 2019

2019 is another good, very typical year for this variety – lots of green fruits with notes of muscatel grapes and pear. These are complemented by woody and grassy aromas of myrrh and hay and rounded off by notes of lemongrass and cucumber.

AROMA CHARACTERISTICS

In Hallertau Blanc, spicy/herbal to woody notes of tomato leaves and barrique are combined with wine aromas of muscatel and Federweisser. In the raw hops, these are complemented by green vegetal elements of lovage and onion, but grapefruit notes and fruity nuances of strawberry and cassis can also be distinguished.



Hallertau Blanc is a daughter of the cultivar Cascade with a fruity-floral white wine bouquet. This aroma variety was bred in Hüll at the request of the beer industry in light of its demand for bold tastes and new aromas and entered the market in 2012.

ANALYSIS DAUGHTER OF CASCADE

Growing area	Germany
Heritage	Daughter of Cascade
Alpha Acids*	9,0 - 11,0 %
Total Polyphenols	1,5 - 1,8 %
Myrcene	70,5 % Total Oils
Beta Acids	4,0 - 7,0 %
Total Oil	no data
Linalool	0,4 % Total Oils

* The alpha content is determined by means of spectrophotometric analysis.



Hallertau Blanc

Germany



Key Flavors





Hallertauer Magnum

Germany



Key Flavors

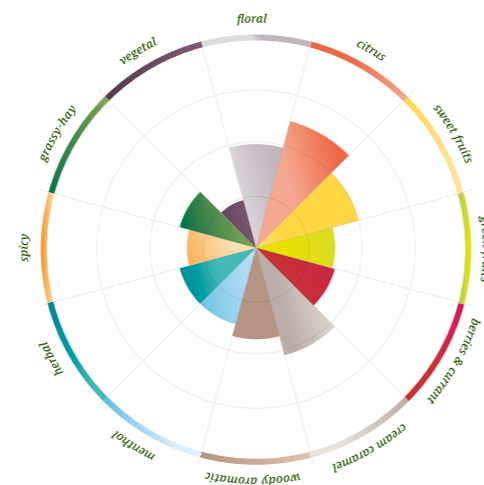
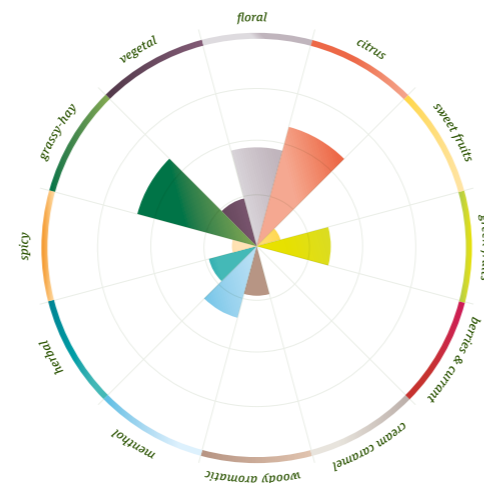


Hallertauer Magnum's unusually large and heavy cones make it worthy of its name. This high alpha variety from Hüll is characterised by its good yields and its high resistance to diseases. Magnum is the most important bittering variety in Germany.

ANALYSIS DAUGHTER OF US GALENA

Growing area	Germany
Heritage	Daughter of US Galena
Alpha Acids*	11,0 - 16,0 %
Total Polyphenols	2,0 - 3,0 %
Myrcene	30,0 - 45,0 % Total Oils
Beta Acids	5,0 - 7,0 %
Total Oil	1,6 - 2,6 ml/100 g
Linalool	0,2 - 0,7 % Total Oils

* The alpha content is determined by means of spectrophotometric analysis.



CROP 2019

Magnum is primarily known as a variety for bittering beer. However, its aroma profile is also quite respectable. Next to very intense citrus flavors, soft and chocolate type flavors make an appearance. Mint and green apple can also be picked out.

AROMA CHARACTERISTICS

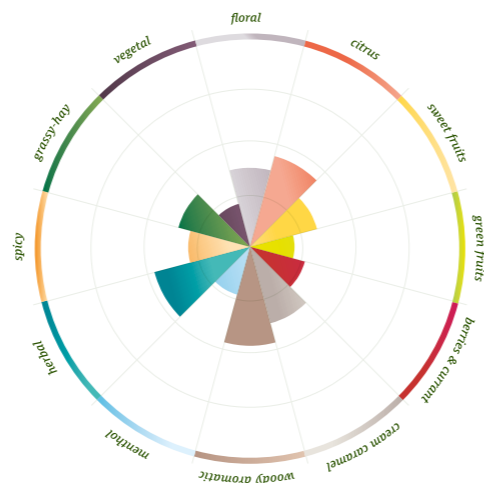
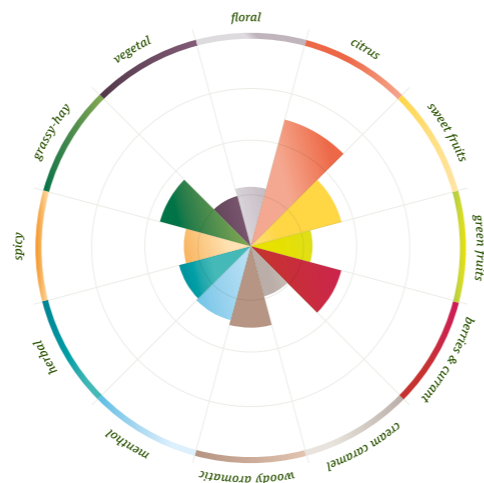
In its raw state, Magnum tends towards cool aromas of mint and sweet fruits. These are accompanied by peppery, spicy notes and resinous flavor nuances.

CROP 2019

The backbone of this variety, which is expressed nicely in 2019, are citrus, herbal and woody notes. Fresh lime and bergamot together with cedar wood are accompanied by peppery notes and Darjeeling flavor. In the background you can find some peach and blackcurrant.

AROMA CHARACTERISTICS

The predominant aromas in this variety are those of citrus and lime, accompanied by vegetal notes. The profile is rounded off with a delicate cassis aroma.



Hallertauer Tradition was bred as a successor to **Hallertauer Mittelfrueh** and was licensed in 1993. It is not comparable to **Hallertauer Mittelfrueh** and is distinguished by its good yields. The hop variety **Tradition** displays good resistance to wilt and downy mildew.

ANALYSIS VALUES

Growing area	Germany
Heritage	Hallertauer Gold x 75/15/106
Alpha Acids*	4,0 - 7,0 %
Total Polyphenols	4,0 - 5,0 %
Myrcene	17,0 - 32,0 % Total Oils
Beta Acids	3,0 - 6,0 %
Total Oil	0,5 - 1,0 ml/100 g
Linalool	0,7 - 1,2 % Total Oils

* The alpha content is determined by means of spectrophotometric analysis.

All values for Hallertauer Tradition from the representative flavor component analysis can be found on pages 6 - 7



Hallertauer Tradition

Germany



Key Flavors



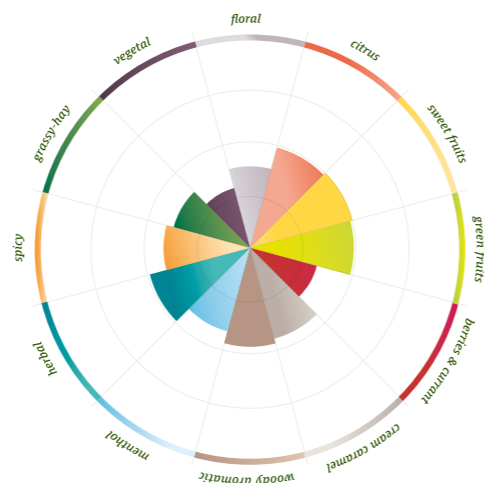
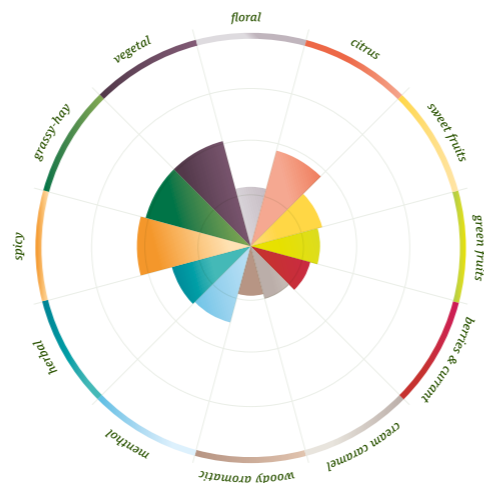


CROP 2019

Like Magnum, Herkules is a variety that is best known for bittering. But let's take a closer look at its aroma profile. Herkules offers something for each aroma category. Amongst the citrus notes, orange and lemongrass can be picked out easily. In addition, you will find notes of honeydew melon, peppermint, majoram and tomato leaves.

AROMA CHARACTERISTICS

Green aromas, such as tomato leaves and peppers, dominate in the raw hops, delicately balanced with floral nuances and the sweet flavor of honeydew melon.



The Herkules cultivar bred at the Hüll hop research institute is aptly named after the mighty Greek hero Hercules. In the Greek saga, Hercules completes tasks that were considered quite impossible. Similarly, this high-alpha variety, with its high yields and intense bitterness has to meet the high demands of growers and brewers alike. Its acreage in Germany is growing fast.

ANALYSIS DAUGHTER OF TAURUS

Growing area	Germany
Heritage	Daughter of Taurus
Alpha Acids*	12,0 - 17,0 %
Total Polyphenols	3,0 - 4,0 %
Myrcene	30,0 - 50,0 % Total Oils
Beta Acids	4,0 - 5,5 %
Total Oil	1,6 - 2,4 ml/100 g
Linalool	0,3 - 0,8 % Total Oils

* The alpha content is determined by means of spectrophotometric analysis.

Herkules

Germany



Key Flavors

Melissa

Orange

Honeydew Melon

Peppermint

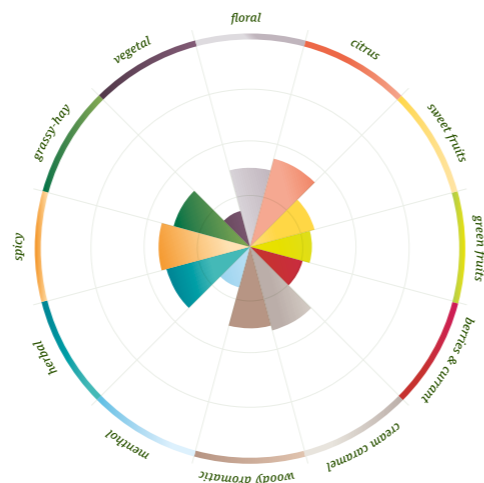
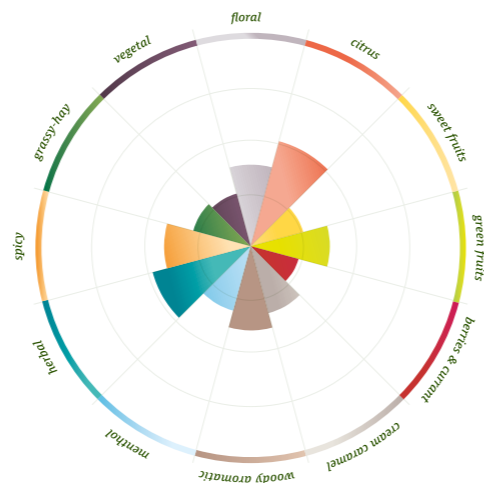
Lemongrass

CROP 2019

This traditional noble hop variety provides citrus flavors but also floral, herbal and spicy aroma notes. Next to camomile and grapefruit you will find wintery notes of ginger bread and honey but also majoram and black tea.

AROMA CHARACTERISTICS

The dominant elements in this variety are savoury aromas such as lovage combined with a pinch of ginger and lemon-grass.



Hersbrucker Spät

Germany

Hersbrucker, a traditional variety from the growing region of the same name, has strong growth characteristics and a particularly robust nature. It is largely resistant to pathogens.

ANALYSIS LANDRACE VARIETY

Growing area	Germany
Heritage	landrace variety
Alpha Acids*	1,5 - 4,0 %
Total Polyphenols	5,0 - 6,0 %
Myrcene	15,0 - 30,0 % Total Oils
Beta Acids	2,5 - 6,0 %
Total Oil	0,5 - 1,0 ml/100 g
Linalool	0,5 - 1,0 % Total Oils

* The alpha content is determined by means of spectrophotometric analysis.



Key Flavors

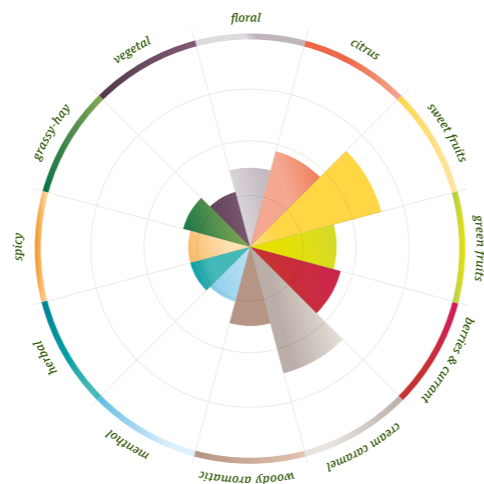
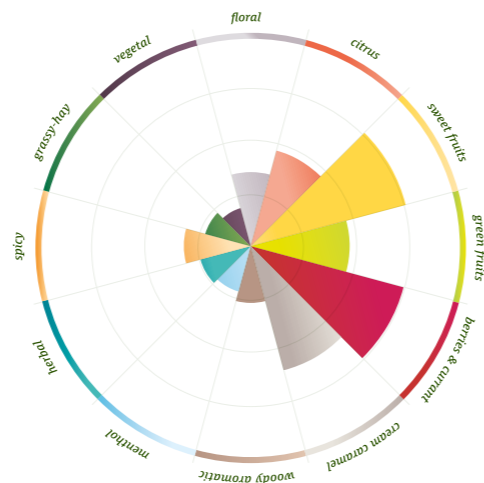


CROP 2019

If you are looking for red berries and sweet fruit aromas, look no further than this hop variety. And crop 2019 confirms the typical profile: creamy strawberry yoghurt, caramelised pear, raspberry and cantaloupe melon combine with woody notes of tobacco and cognac.

AROMA CHARACTERISTICS

This cultivar displays sweet fruity aromas of wild strawberry and melon, rounded off by creamy notes of yoghurt. Fruit tea or more specifically peach-flavored ice tea and herbal-spicy lemon balm, aniseed, lavender and floral geranium give the hop its special character.



Hüll Melon is a new variety from Hüll whose character is typified by strong honeydew melon and strawberry notes. This cultivar is a daughter of Cascade and was released in 2012. As an aroma variety, it was bred at the request of the beer industry in light of its demand for bold tastes and new aromas.

ANALYSIS DAUGHTER OF CASCADE

Growing area	Germany
Heritage	Daughter of Cascade
Alpha Acids*	7,0 - 8,0 %
Total Polyphenols	3,0 - 4,0 %
Myrcene	36,2 % Total Oils
Beta Acids	6,0 - 8,0 %
Total Oil	0,8 - 2,1 ml/100 g
Linalool	0,2 % Total Oils

* The alpha content is determined by means of spectrophotometric analysis.



Hüll Melon

Germany



Key Flavors



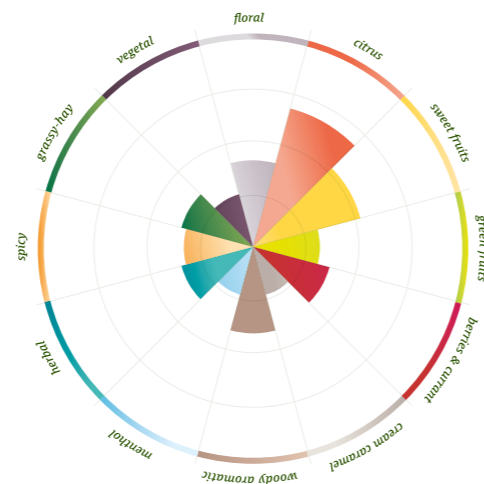
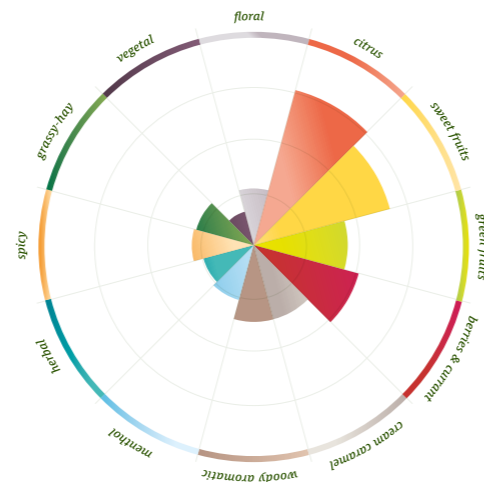


CROP 2019

The year 2019 is a celebration of citrus fruits for this variety: orange, grapefruit and tangerine together with tropical juices made of passion fruit, mango, pine apple and banana. In the background you will find delicate spicy and herbal notes of basil and parsley.

AROMA CHARACTERISTICS

The raw hops present notes of raspberry, orange, ginger, elderflower, and chocolate. A hint of lemon balm underlines these aromas.



Named after a high peak in the Caucasus Mountains, Kazbek is equally outstanding thanks to the lemon-fruity character of its hop aroma. This cultivar was released in 2008.

ANALYSIS FROM A RUSSIAN WILD HOP

Growing area	Czech Republic
Heritage	from a russian wild hop
Alpha Acids*	5,0 - 8,0 %
Total Polyphenols	3,5 - 4,5 %
Myrcene	40,0 - 55,0 % Total Oils
Beta Acids	4,0 - 6,0 %
Total Oil	0,9 - 1,8 ml/100 g
Linalool	0,3 - 0,5 % Total Oils

* The alpha content is determined by means of spectrophotometric analysis.

Kazbek

Czech Republic



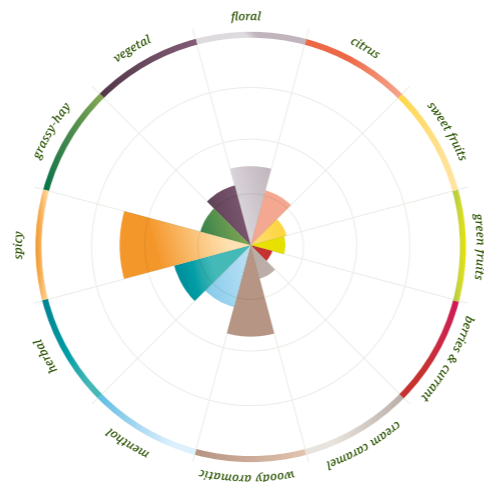
Key Flavors





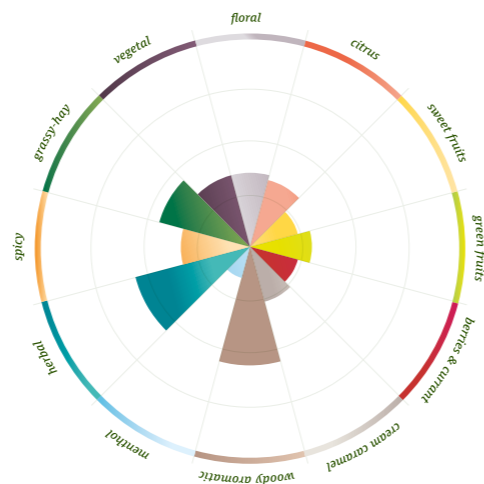
CROP 2019

This hop variety is not mellow. The three pillars of its aroma profile are herbal, spicy and green-grassy. Further noticeable characteristics are resinous and peppery notes. Lovage, dill and thyme also contribute to the overall aroma profile.



AROMA CHARACTERISTICS

This cultivar is defined by extremely spicy aromas of pepper, juniper, dill and curry, combined with cool, floral notes.



Originating from the Saaz hop, this variety is a Puławy breed with very fine aroma characteristics. Today Lublin is cultivated in the Polish growing regions of Lublin, Poznan and Opole. It has an average alpha and hectare yield. However, it is better than that of Saaz. Lublin has a good tolerance to diseases and grows on light to medium heavy soils.

ANALYSIS BRED FROM SAAZ

Growing area	Poland
Heritage	bred from Saaz
Alpha Acids*	3,0 - 4,5 %
Total Polyphenols	4,4 - 5,3 %
Myrcene	22,0 - 29,0 % Total Oils
Beta Acids	3,0 - 4,0 %
Total Oil	0,5 - 1,1 ml/100 g
Linalool	no data

* The alpha content is determined by means of spectrophotometric analysis.

Lublin

Poland



Key Flavors

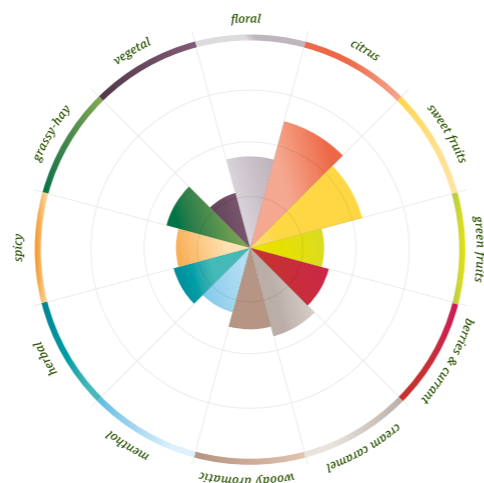
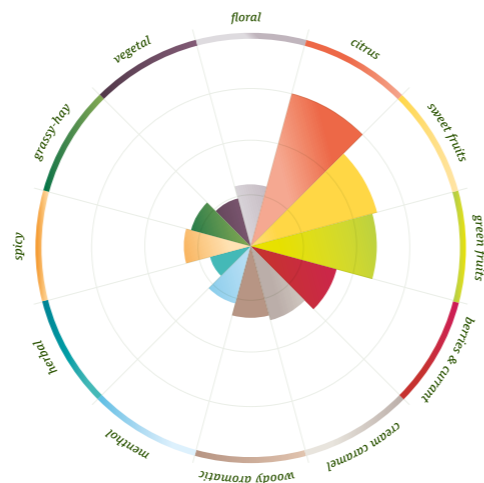


CROP 2019

The characteristic aroma in this hop is, of course, tangerine and so the profile is dominated by citrus fruits in crop 2019. In addition we find green fruits like gooseberry, wine grapes and quince. An exotic hint is added through curry notes and honeydew melon aroma.

AROMA CHARACTERISTICS

The aroma of Mandarina Bavaria is dominated by citrus notes of grapefruit and lemon, with a flavorsome addition of cassis and redcurrant. In addition, spicy elements, such as pepper, and exotic pineapple contribute to the flavor profile.



Mandarina Bavaria is a hop variety with a pleasant fruity aroma and a particularly distinctive tangerine note. This aroma variety was bred in Hüll at the request of the beer industry in light of its demand for bold tastes and new aromas and entered the market in 2012.

ANALYSIS DAUGHTER OF CASCADE

Growing area	Germany
Heritage	Daughter of Cascade
Alpha Acids*	7,0 - 10,0 %
Total Polyphenols	2,3 - 2,7 %
Myrcene	71,0 % Total Oils
Beta Acids	4,0 - 7,0 %
Total Oil	1,5 - 2,2 ml/100 g
Linalool	0,3 % Total Oils

* The alpha content is determined by means of spectrophotometric analysis.

All values for Mandarina Bavaria from the representative flavor component analysis can be found on pages 6 - 7



Mandarina Bavaria

Germany



Key Flavors

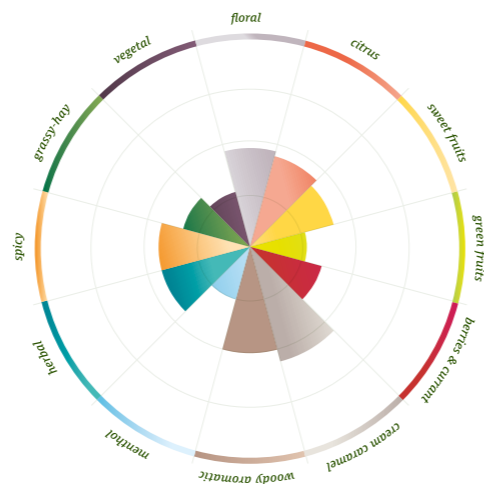
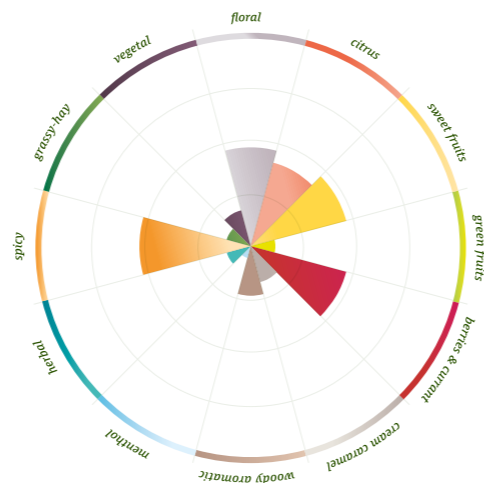


CROP 2019

Marynka is a very balanced hop variety. The variety has something to offer in every aroma category. A bit of floral camomile, a hint of grapefruit, subtle peach, liquorice and hay. It also presents some green tea aromas and a little bit of cucumber.

AROMA CHARACTERISTICS

In its raw state, Marynka displays exceptional spiciness, with notes of liquorice, aniseed and fennel, combined with floral and citrus-like flavor elements.



Marynka

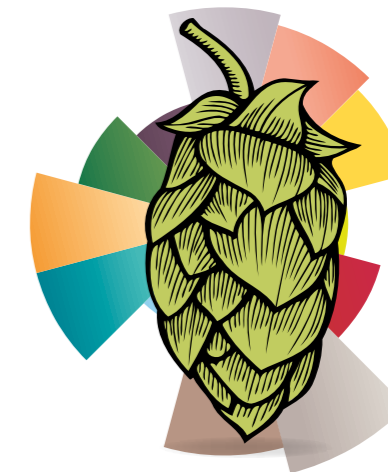
Poland

This variety is popular for both bittering and aroma.

ANALYSIS DAUGHTER OF BREWERS GOLD

Growing area	Poland
Heritage	Daughter of Brewers Gold
Alpha Acids*	9,0 - 12,0 %
Total Polyphenols	4,1 %
Myrcene	28,0 - 31,0 % Total Oils
Beta Acids	10,2 - 13,0 %
Total Oil	1,8 - 2,2 ml/100 g
Linalool	no data

* The alpha content is determined by means of spectrophotometric analysis.



Key Flavors

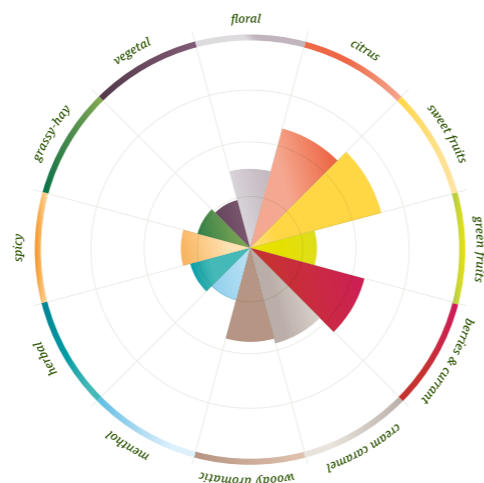
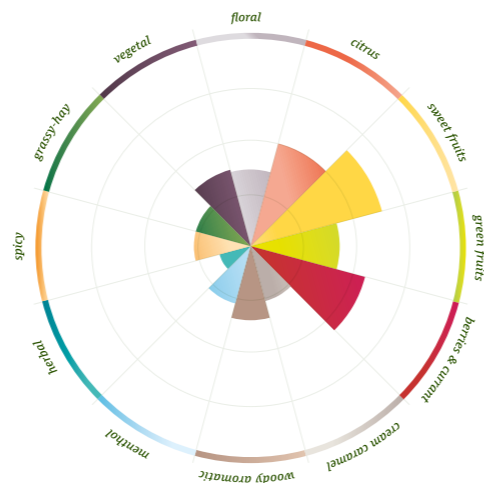


CROP 2019

This year gives us another a glamorous fruity performance. Monroe displays red fruits in crop 2019, including cherry, strawberry and redcurrant. These are combined with creamy toffee notes and a little bit of spicyness.

AROMA CHARACTERISTICS

Just like Marilyn Monroe, this hop variety is a knockout in red (aromas). The raw hops contain lovely notes of raspberry and cassis complimented by orange syrup and lime. Other characteristics such as gooseberry and quince are also present.



The new hop variety Monroe is almost as extravagant in character as the actress it was named after. With an alpha content below 3,0 % and an oil content of approximately 1,0 ml/100 g, Monroe comes across initially as mild and smooth. When you add the hop to a beer, that is when it shows its true colors.

ANALYSIS FROM AMERICAN WILD HOPS

Growing area	Germany
Heritage	from American wild hops
Alpha Acids*	2,8 - 2,9 %
Total Polyphenols	4,5 - 4,6 %
Myrcene	no data
Beta Acids	6,5 - 7,5 %
Total Oil	1,0 ml/100 g
Linalool	no data

* The alpha content is determined by means of spectrophotometric analysis.



Monroe

Germany



Key Flavors



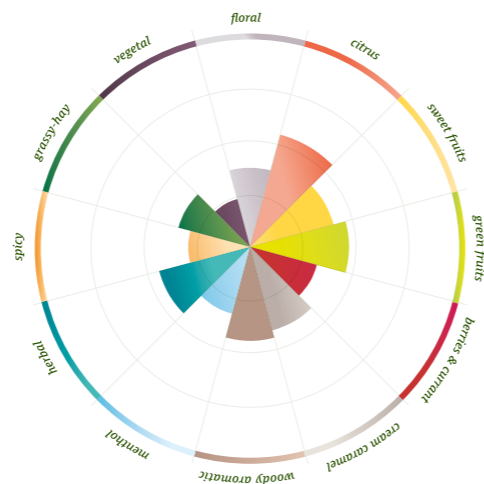
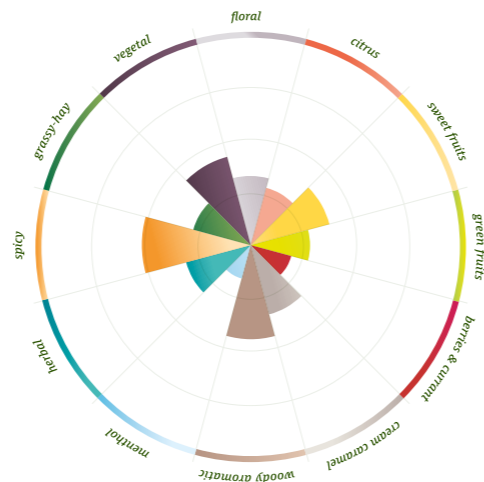


CROP 2019

In 2019, Perle delivers a very fruity impression. Elegant citrus aromas with quince and also some dried fruits lead to a rounded aroma. Woody notes like leather and herbal aromas like oregano and also oolong tea provide a nice counterbalance.

AROMA CHARACTERISTICS

The aroma of this variety dominated by green fruit, citrus and and honey notes, counterbalanced by hints of cedar and black tea.



Perle is descended from Northern Brewer and was bred in Hüll. It is widely grown in Germany and in Oregon and Washington in the USA. It is very popular due to its balanced aromas and high bitterness levels. Its remarkable yields and high resistance to disease also make it very attractive to hop growers.

ANALYSIS DESCENDED FROM NORTHERN BREWER

Growing area	Germany
Heritage	Northern Brewer
Alpha Acids*	4,0 - 9,0 %
Total Polyphenols	3,0 - 5,0 %
Myrcene	20,0 - 35,0 % Total Oils
Beta Acids	2,5 - 4,5 %
Total Oil	0,5 - 1,5 ml/100 g
Linalool	0,2 - 0,6 % Total Oils

* The alpha content is determined by means of spectrophotometric analysis.

All values for Perle from the representative flavor component analysis can be found on pages 6 - 7

Perle

Germany



Key Flavors

Leek

Majoram

Chili

Celery

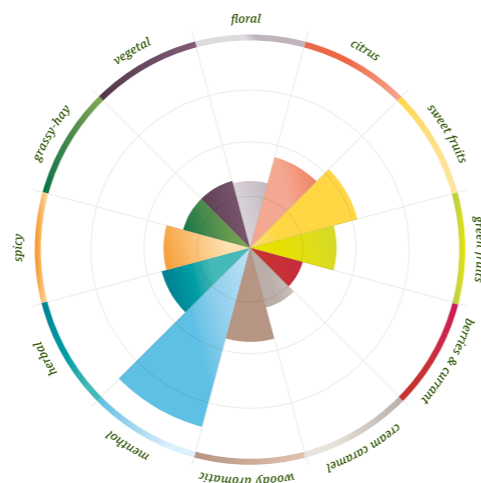
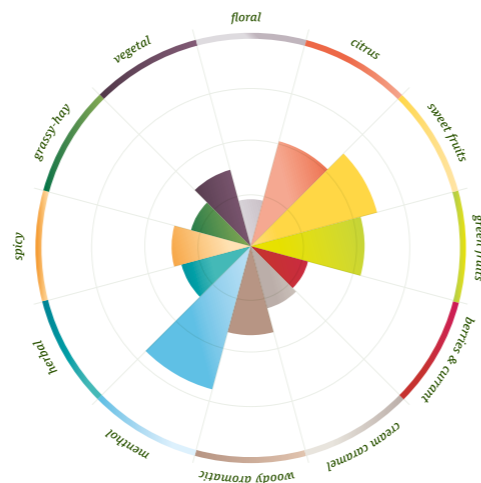


CROP 2019

For this crop, Polaris stays true to its name, with a very strong menthol character composed of mint, eucalyptus and lemon balm! In addition, there are sweet fruits like pineapple and also quince.

AROMA CHARACTERISTICS

As can be gathered from the name of the cultivar, cool menthol notes of mint play a key role in its aroma profile. Spicy aromatic elements of cumarin, Artemesia, woodruff, lemon balm and bergamot can also be distinguished. Fruity quince and pineapple add to the interesting overall picture.



Polaris is a new variety with an intense and pleasant fruit aroma. Its refreshing aroma is reminiscent of a peppermint with fruity and resin notes. This aroma variety was bred in Hüll at the request of the beer industry in light of its demand for bold tastes and new aromas. It entered the market in 2012.

ANALYSIS HÜLL BREEDING LINE

Growing area	Germany
Heritage	Hüll breeding line
Alpha Acids*	18,0 - 24,0 %
Total Polyphenols	2,6 - 2,7 %
Myrcene	50,3 % Total Oils
Beta Acids	5,0 - 6,5 %
Total Oil	2,4 - 4,4 ml/100 g
Linalool	0,2 % Total Oils

* The alpha content is determined by means of spectrophotometric analysis.

Polaris

Germany



Key Flavors



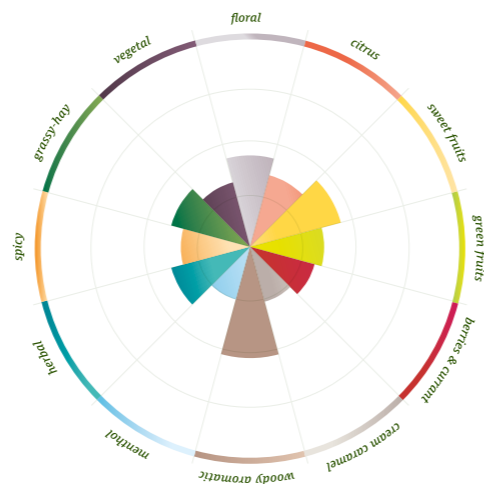
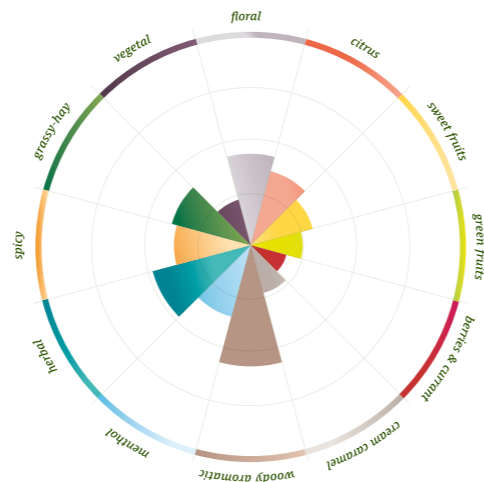


CROP 2019

Relax is one of the varieties that is different from all others. True to variety, 2019 Relax shows special aromas: There is lavender and rose, while cognac, barrique and leather represent the woody flavors. But wild roses and lychee can also be found.

AROMA CHARACTERISTICS

With such a high oil content, a wide range of aromas is to be expected in this hop variety. From cornflower and the aroma of alpine meadows to lemongrass and hibiscus, this variety shows a refreshing profile.



Relax is a hop variety originally bred not for beer, but for tea. Despite having a very low α -acid content, Relax has a remarkably high β -acid and oil content, which still makes it a very attractive variety for brewers.

ANALYSIS BREEDING LINE FROM HÜLL

Growing area	Germany
Heritage	Hüll breeding line
Alpha Acids*	0,3 %
Total Polyphenols	no data
Myrcene	no data
Beta Acids	10,0 - 15,0 %
Total Oil	1,0 - 1,3 ml/100 g
Linalool	no data

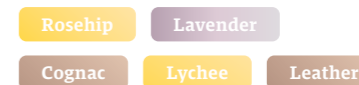
* The alpha content is determined by means of spectrophotometric analysis.

Relax

Germany



Key Flavors



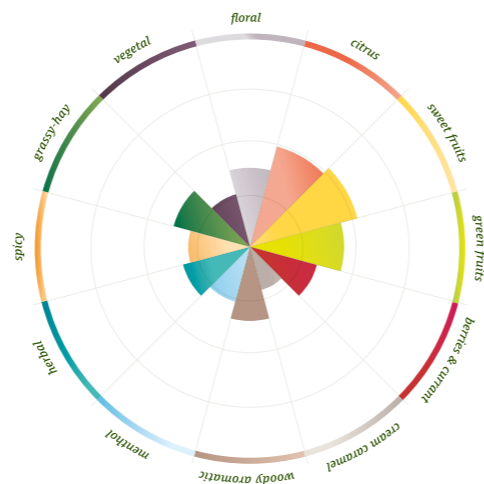
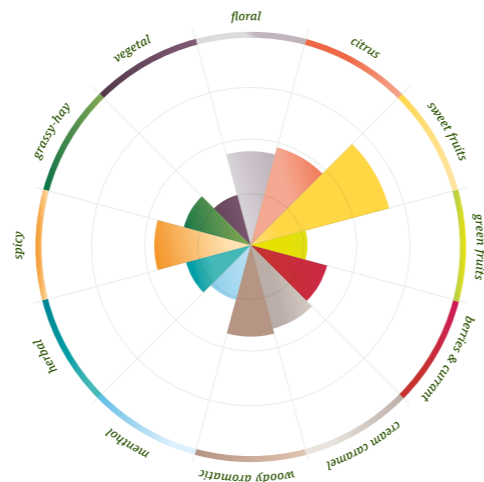


CROP 2019

Saaz Late has very little in common with the original variety Saaz. What they have in common are noble green-grassy and woody aromas and notes of camomile flowers. Additionally, Saaz 2019 offers us very nice fruity aromas: lime, plum, gooseberries, a little bit of passion fruit and raspberry are also part of the equation.

AROMA CHARACTERISTICS

In its raw state, Saaz Late is extremely sweet and fruity, with predominant notes of passion fruit, melon, strawberries, peach and multivitamin juice. A fine aroma of honey and chocolate rounds off the overall impression.



Saaz Late was bred from Saaz and was registered in 2010.

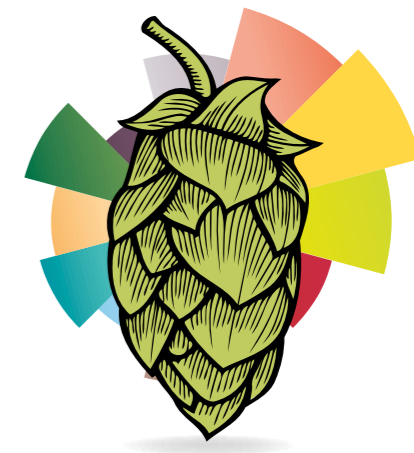
ANALYSIS OPEN POLLINATION OF SAAZER

Growing area	Czech Republic
Heritage	open pollination of Saazer
Alpha Acids*	3,5 - 6,0 %
Total Polyphenols	5,0 - 60,0 %
Myrcene	25,0 - 35,0 % Total Oils
Beta Acids	4,0 - 6,5 %
Total Oil	0,5 - 1,0 ml/100 g
Linalool	0,2 - 0,4 % Total Oils

* The alpha content is determined by means of spectrophotometric analysis.

Saaz Late

Czech Republic



Key Flavors

Passion Fruit

Camomile Tea

Raspberry

Lemon

Blackberry

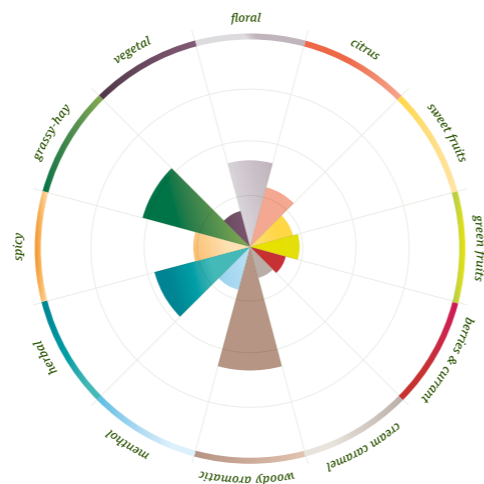
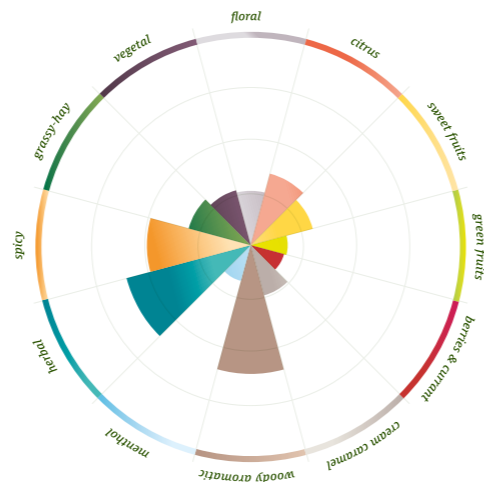


CROP 2019

Saaz is displayed very typically in 2019: green-grassy, woody and many different herbs, but also many earthy and hay-like aromas. A fine year for this special hop variety.

AROMA CHARACTERISTICS

Spicy, woody, herbal - an unmistakable hop variety. It tastes of tobacco, cognac, barrique barrels, hay and leather.



Saaz continues to be popular with brewers around the World and is a key contributor to the distinct aroma of the famous Czech pilseners. This traditional landrace delivers a mild but characteristic hoppy aroma profile.

ANALYSIS LANDRACE VARIETY

Growing area	Czech Republic
Heritage	landrace variety
Alpha Acids*	3,0 - 6,0 %
Total Polyphenols	5,5 - 7,0 %
Myrcene	25,0 - 40,0 % Total Oils
Beta Acids	4,5 - 8,0 %
Total Oil	0,4 - 1,0 ml/100 g
Linalool	0,5 % Total Oils

* The alpha content is determined by means of spectrophotometric analysis.

Saaz

Czech Republic



Key Flavors



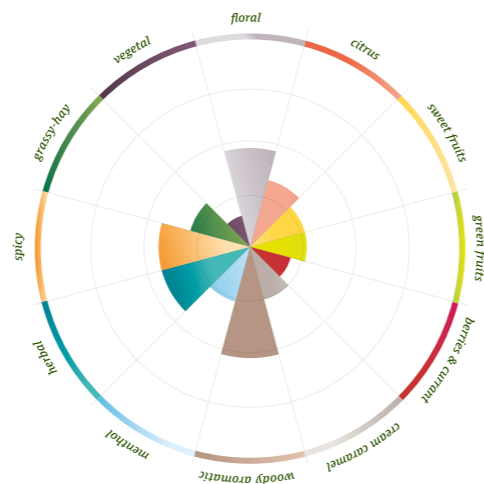
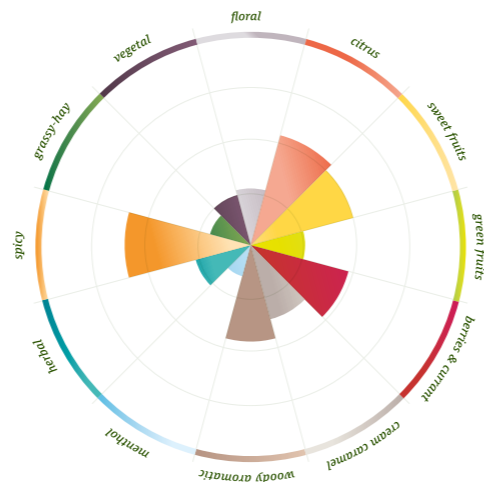


CROP 2019

In 2019, Saphir shows floral, citrus type and many herbal aromas. Lemongrass, geranium, green tea and tarragon are also distinguishable. Juniper, cognac and hay play a supporting role.

AROMA CHARACTERISTICS

The unique wealth of contrast in its flavor profile is expressed in the raw hops in its spicy woodiness of juniper, combined with red fruits, such as strawberry. These aromas are complemented by hints of citrus, bergamot, lemongrass, black tea and green fruits.



Saphir differs considerably from other German aroma varieties with its fruity aroma characteristics. Saphir was bred at the “Hopfenforschungszentrum Hüll” and was released in 2000, together with the varieties Smaragd and Opal as new aroma varieties.

ANALYSIS HÜLL BREEDING LINE

Growing area	Germany
Heritage	Hüll breeding line
Alpha Acids*	2,0 - 4,5 %
Total Polyphenols	4,0 - 5,0 %
Myrcene	25,0 - 40,0 % Total Oils
Beta Acids	4,0 - 7,0 %
Total Oil	0,8 - 1,4 ml/100 g
Linalool	0,8 - 1,3 % Total Oils

* The alpha content is determined by means of spectrophotometric analysis.

Saphir

Germany



Key Flavors



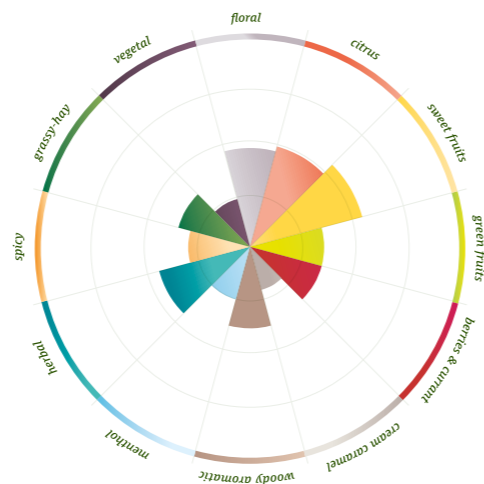
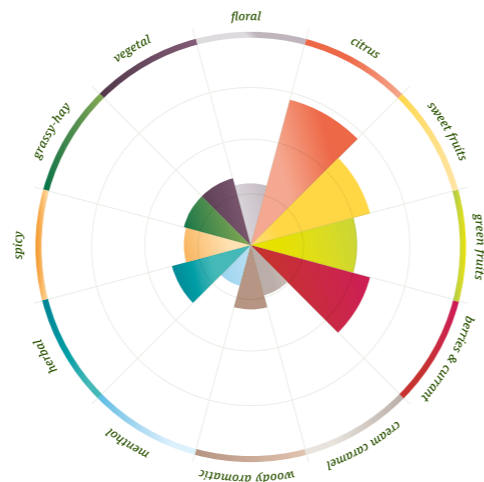


CROP 2019

Sladek is one of the hop varieties, from which you would not expect pronounced fruitiness. For 2019, Sladek shows heavy citrus and sweet fruit aromas together with gooseberries. This is rounded off by woody pine notes.

AROMA CHARACTERISTICS

When it comes to citrus, green fruits and berries, this variety is second to none. Here, tangy grapefruit meets exciting cassis, melon and apple meet quince and gooseberry.



The cultivar's name **Sládek** is derived from the Czech word meaning "beer brewer". **Sládek's** fruity flavor profile and its well-balanced bitter taste give the beer a special character.

ANALYSIS DESCENDED FROM NORTHERN BREWER AND SAAZ

Growing area	Czech Republic
Heritage	descended from Northern Brewer and SaaZ
Alpha Acids*	5,0 - 9,0 %
Total Polyphenols	3,5 - 5,0 %
Myrcene	25,0 - 40,0 % Total Oils
Beta Acids	8,0 - 11,0 %
Total Oil	0,8 - 1,0 ml/100 g
Linalool	0,15 - 0,3 % Total Oils

* The alpha content is determined by means of spectrophotometric analysis.

Sladek

Czech Republic



Key Flavors



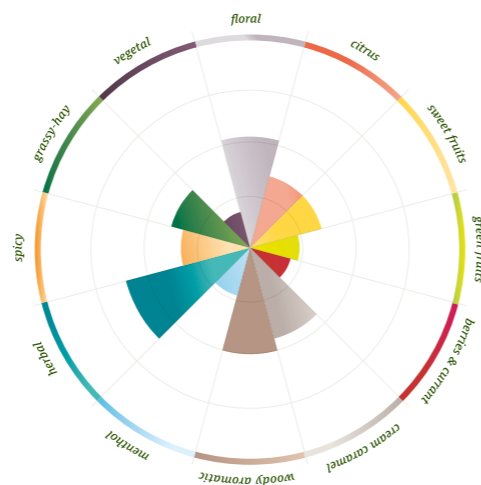
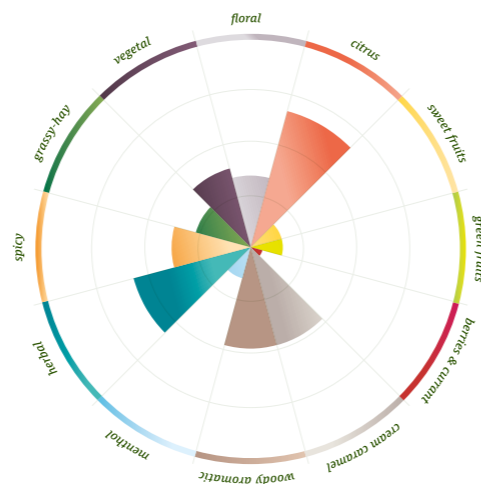


CROP 2019

Strisselspalt is one of the old landrace varieties and instead of competing with other varieties on aroma intensity, we love this variety for its noble and concerted aroma. Very balanced with only some flavor impressions such as green tea, citrus and grapefruit breaking through the aroma background.

AROMA CHARACTERISTICS

Its aroma is of medium intensity. The predominant aromas in the raw hops are citrus, bergamot, grapefruit and orange, with a tendency towards flavor notes ranging from cream-caramel to spicy.



Strisselspalt is one of the most well-known Alsatian hop varieties from the region around Strasbourg. Its name is derived from the terms “strissel” and “spalt”, meaning “bouquet” and “quality”, respectively. Strisselspalt is famous for its noble hop aroma.

ANALYSIS LANDRACE VARIETY

Growing area	France
Heritage	landrace variety
Alpha Acids*	1,8 - 2,5 %
Total Polyphenols	3,8 %
Myrcene	35,0 - 52,0 % Total Oils
Beta Acids	3,0 - 6,0 %
Total Oil	0,6 - 0,8 ml/100 g
Linalool	0,8 % Total Oils

* The alpha content is determined by means of spectrophotometric analysis.

Strisselspalt

France



Key Flavors

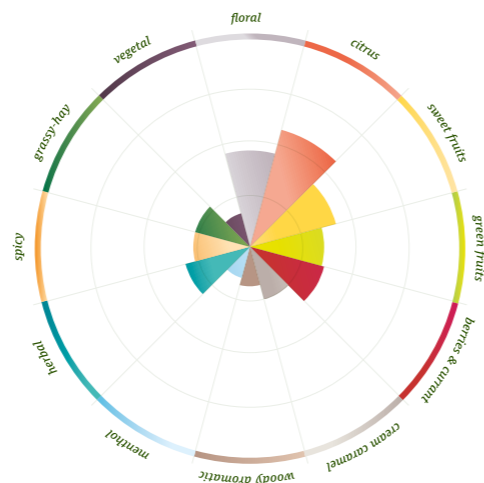
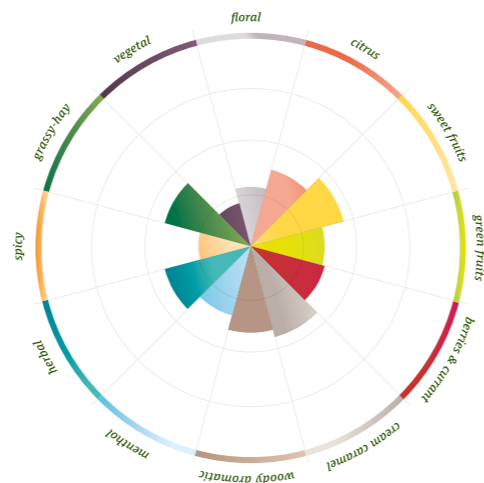


CROP 2019

For this variety, spicy and herbal flavor elements are key. In 2019, juniper and curry but also thyme and basil dominate the flavor profile. In addition, there are green-grassy notes, such as cucumber and nettle; but also honey and yoghurt.

AROMA CHARACTERISTICS

The raw hops present spicy and herbal aromas with woody aromatic, hay and green-grassy (nettle) notes. These are complemented by cream and honey aromas.



Styrian Gold

Slovenia

Styrian Gold was bred from Styrian Savinski Golding to improve agronomical performance and was released in 2009. It is grown primarily in Slovenia and possesses a very characteristic aroma.

ANALYSIS DAUGHTER OF SAVINJSKI GOLDING

Growing area	Slovenia
Heritage	Daughter of Styrian Savinski Golding
Alpha Acids*	3,5 - 6,5 %
Total Polyphenols	no data
Myrcene	38,0 - 47,0 % Total Oils
Beta Acids	3,5 - 5,9 %
Total Oil	1,3 - 2,3 ml/100 g
Linalool	1,3 - 2,3 % Total Oils

* The alpha content is determined by means of spectrophotometric analysis.



Key Flavors





Styrian Savinjski Golding

Slovenia



Key Flavors

Peppermint

Lemon Tea

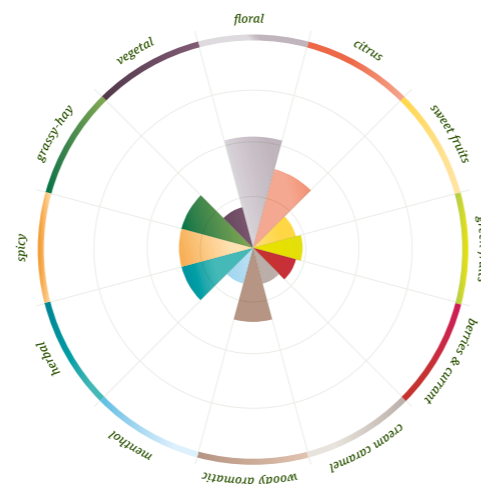
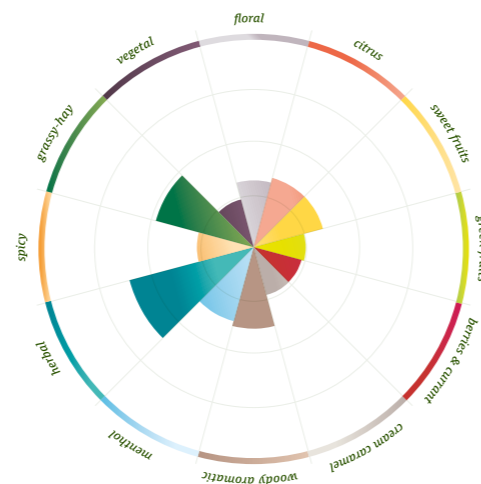
Lemongrass

Styrian Savinjski Golding is a traditional Slovenian variety originating from the English variety Fuggle, which was brought to Slovenia in the early 19th century. This variety is known for its noble hop aroma and pleasant bitterness.

ANALYSIS DAUGHTER OF FUGGLE

Growing area	Slovenia
Heritage	Daughter of Fuggle
Alpha Acids*	4,5 - 6,0 %
Total Polyphenols	no data
Myrcene	27,0 - 33,0 % Total Oils
Beta Acids	2,5 - 3,5 %
Total Oil	0,5 - 1,0 ml/100 g
Linalool	0,8 % Total Oils

* The alpha content is determined by means of spectrophotometric analysis.



CROP 2019

We know this variety as being primarily herbal but 2019 is different. This year, we see a strong floral influence in the aroma profile with geranium, camomile and lilac. There is also more peppery spicyness whereas the herbal and green-grassy notes are subdued.

AROMA CHARACTERISTICS

In the raw hops, citrus and tea-like components such as lemongrass and green tea predominate, along with peppermint and green apple. In addition, spicy herbal notes combine with elements of sweet fruits.

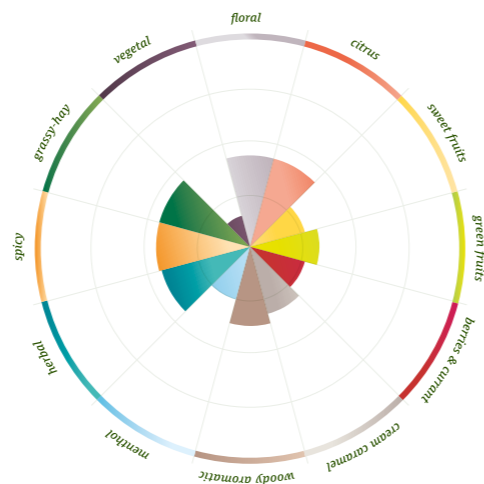
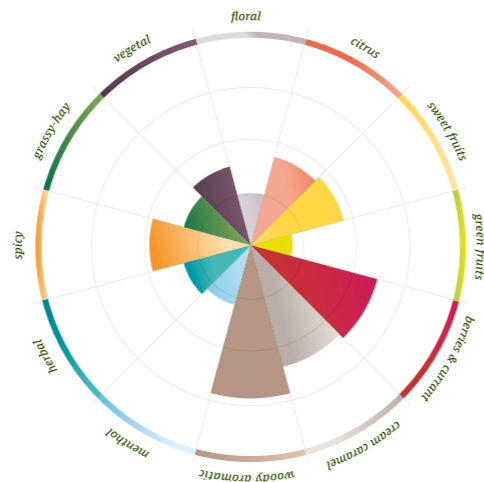


CROP 2019

Tettanger 2019 presents a broad flavor spectrum, without any aromas dominating clearly. There is a hint of raspberries, but also camomile and green tea, some parsley and a little bit of cucumber.

AROMA CHARACTERISTICS

In the raw hops, woody aromas and cream caramel components, such as gingerbread and almonds, predominate, combined with fruity blueberry notes.



Tettnanger is a traditional variety from the Saaz group, which is primarily grown around Tett nang near Lake Constance. The region's favourable climate and sandy clay soil drive this variety's noble aroma. Tettnanger is particularly resistant to pathogens.

ANALYSIS VALUES

Growing area	Germany
Heritage	landrace variety
Alpha Acids*	2,5 - 5,5 %
Total Polyphenols	5,0 - 6,0 %
Myrcene	20,0 - 35,0 % Total Oils
Beta Acids	3,0 - 5,0 %
Total Oil	0,5 - 0,9 ml/100 g
Linalool	0,4 - 0,9 % Total Oils

* The alpha content is determined by means of spectrophotometric analysis.

Tett nang Tettnanger

Germany



Key Flavors



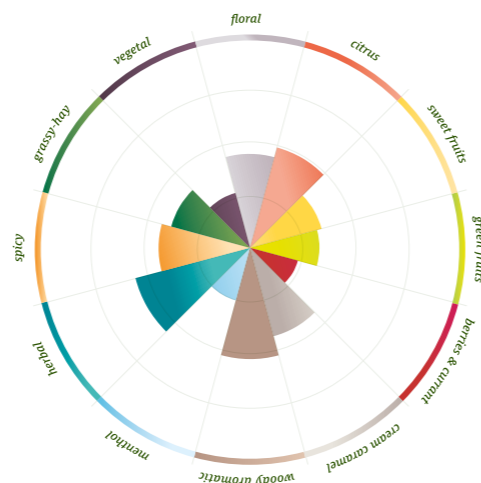
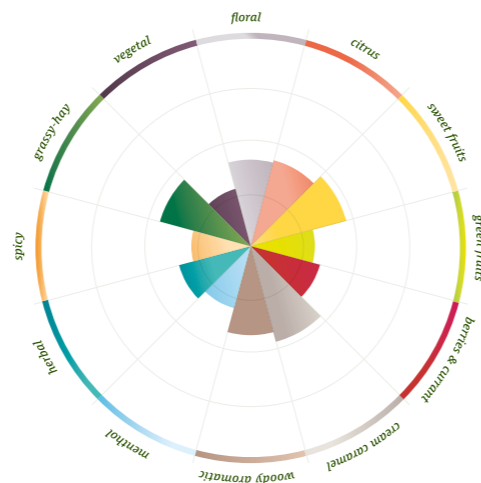


CROP 2019

This hop provides intense, fresh, summery aromas, consisting of menthol, pine and parsley. The typical creamy yoghurt and honey character is less distinct in 2019.

AROMA CHARACTERISTICS

Triskel's aroma is dominated by green vegetal artichokes, peppers and nettles. Woody-aromatic tobacco contributes an interesting note to the overall flavor profile. Besides these green vegetal components, there are elements of creamy yoghurt with sweet honey, fruity peach, succulent watermelon and floral geranium.



Triskel is a newly bred hop with an aroma similar to Strisselspalt. The name "Triskel" was inspired by triskelion, the symbol of the Gauls, the ancestors of the modern French people. This represents the three elements: earth, air and water.

ANALYSIS VALUES

Growing area	France
Heritage	cross between Strisselspalt and a male descendant of the Englisch varietal Yeoman
Alpha Acids*	8,0 - 9,0 %
Total Polyphenols	3,7 - 5,4 %
Myrcene	60,0 % Total Oils
Beta Acids	4,0 - 4,7 %
Total Oil	1,5 - 2,0 ml/100 g
Linalool	0,7 % Total Oils

* The alpha content is determined by means of spectrophotometric analysis.

Triskel

France

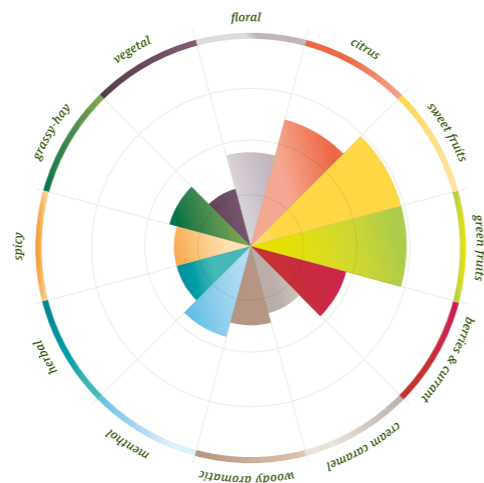


Key Flavors



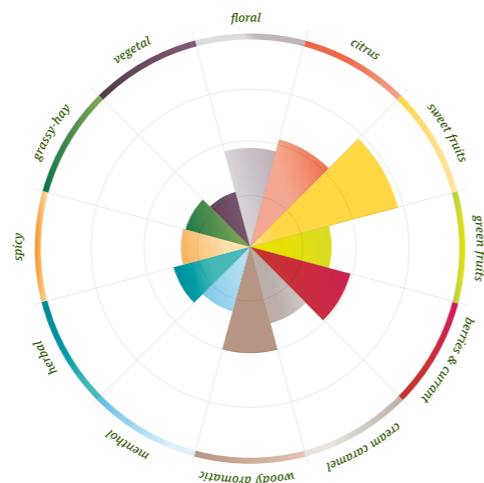
CROP 2019

This hop variety is characterised by strong sweet fruit flavors, such as mango and kiwi. Mint also plays a refreshing part in the aroma profile. In the 2019 crop, green fruit flavors like quince, gooseberries and pear flavors are especially strong.



AROMA CHARACTERISTICS

The appeal of this variety lies in its aroma of green fruits, such as quince and gooseberry. These are complemented by sweet mango and kiwi, while mint adds a freshness to the overall profile.



Azacca™

United States

Azacca™ is the lwa or the spirit of the agriculture and the farming practices. The hop formerly known as #483 was released by the American Dwarf Hop Association 2014.

ANALYSIS VALUES

Growing area	United States
Heritage	Descended from Toyomidori
Alpha Acids*	14,0 - 16,0 %
Total Polyphenols	no data
Myrcene	46,0 - 55,0 % Total Oils
Beta Acids	4,0 - 5,5 %
Total Oil	1,4 - 2,0 ml/100 g
Linalool	no data

* The alpha content is determined by means of spectrophotometric analysis.



Key Flavors



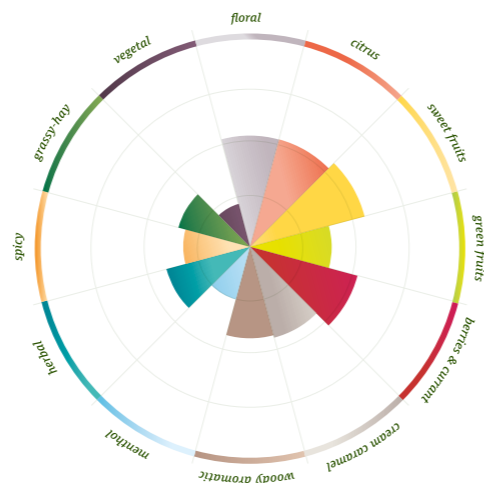
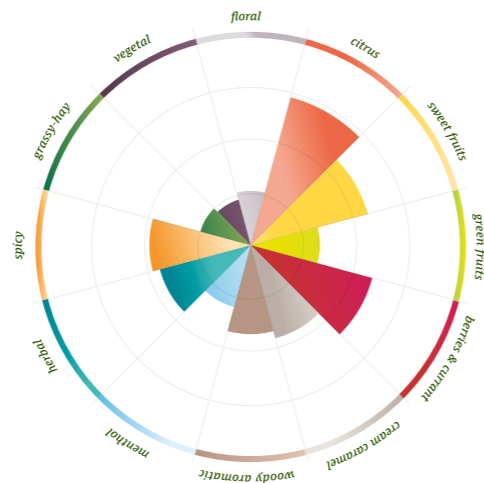


CROP 2019

Once again, this year, we are presented with a prominent fruity aroma mix, dominated by lemon overtones. This is followed by strong berry and caramel flavors and sweet fruit notes.

AROMA CHARACTERISTICS

Cascade's aroma is dominated by fresh grapefruit, complemented by green fruits, such as white grapes and quince, as well as pineapple and red berries, with a hint of raspberry sauce.



The Cascade cultivar takes its name from the Cascades, a mountain range of volcanic origin in the USA. The variety was bred in Oregon as part of the USDA breeding programme and released in 1972. The typical features of Cascade are its long, dark-green cones and its relatively low alpha acid content. Cascade has a very pleasant fruity, citrus-like aroma.

ANALYSIS VALUES

Growing area	Vereinigte Staaten
Heritage	cross of Englisch Fuggle with a male descendant of the Russian variety Serebrianka
Alpha Acids*	4,5 - 7,0 %
Total Polyphenols	no data
Myrcene	45,0 - 60,0 % Total Oils
Beta Acids	4,8 - 7,0 %
Total Oil	0,7 - 1,4 ml/100 g
Linalool	no data

* The alpha content is determined by means of spectrophotometric analysis.

Cascade

United States



Key Flavors



USA

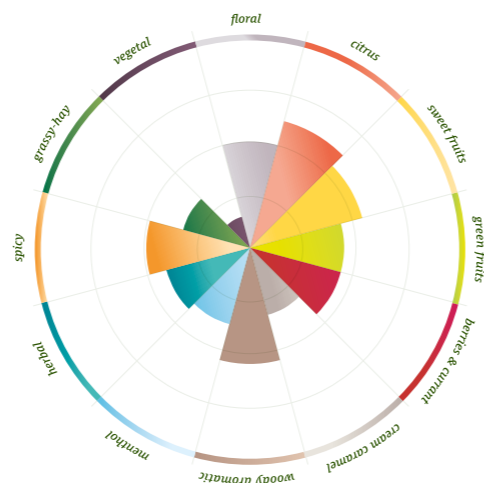
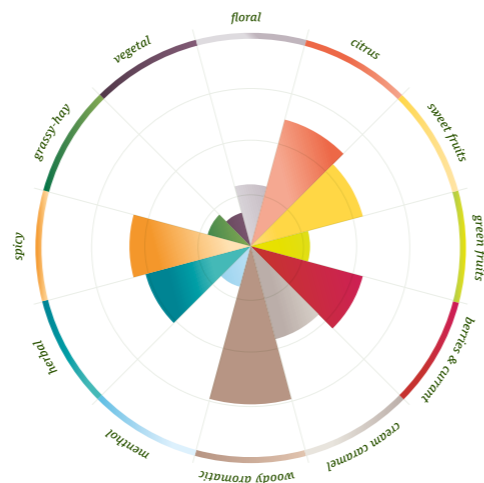


CROP 2019

Centennial shows its sweet lemony side in crop 2019. Bergamot and lemongrass go hand in hand with pineapple and lychee. Additionally, the resin and woody character is intensively expressed in this crop.

AROMA CHARACTERISTICS

In Centennial, woody-spicy aromas of spruce, barrique, tonka bean, tarragon and aniseed combine with fruity raspberry notes to produce a well-rounded character.



Centennial is a relatively new high-alpha variety. First released in 1990, Centennial is composed of ¾ Brewers Gold and minor shares of other cultivars, such as Fuggle and East Kent Golding. Sometimes it is also referred to as Super Cascade, but the citrus character that predominates in Cascade is not as strongly noticeable in Centennial.

ANALYSIS VALUES

Growing area	United States
Heritage	3/4 Brewers Gold, 3/32 Fuggle, 1/16 East Kent Golding, 1/32 Bavarian 1/16 unknown
Alpha Acids*	9,5 - 11,5 %
Total Polyphenols	no data
Myrcene	45,0 - 55,0 % Total Oils
Beta Acids	3,4 - 4,5 %
Total Oil	1,5 - 2,5 ml/100 g
Linalool	no data

* The alpha content is determined by means of spectrophotometric analysis.

Centennial

United States



Key Flavors



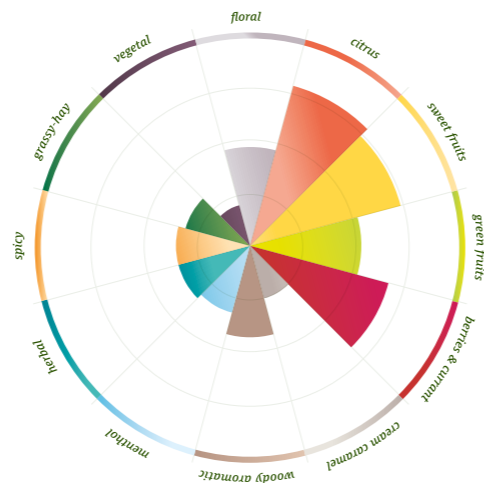
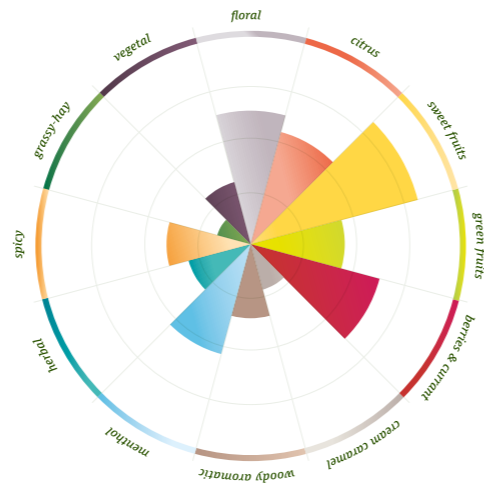


CROP 2019

Citra® tends to have a competition between citrus, fruity and berry characters each crop year. In 2019, the sweet fruits definitely win: mango, lychee, passion fruit – you name it. Still, the citrus and the berry characters continue to be strong.

AROMA CHARACTERISTICS

As its name suggests, Citra®'s flavor profile contains citrus fruits, such as lime and grapefruit. However, tropical fruit notes of passion fruit, peach, lychee and many others also contribute to its uniquely fruity aroma.



Citra® is an aroma hop with a promising future. Developed by the Hop Breeding Company, it has unique and captivating flavor characteristics. The hop variety (HBC 394) originated from a cross between Hallertauer Mittelfrueh and a father derived from U.S. Tettnang. It was released in 2008.

ANALYSIS VALUES

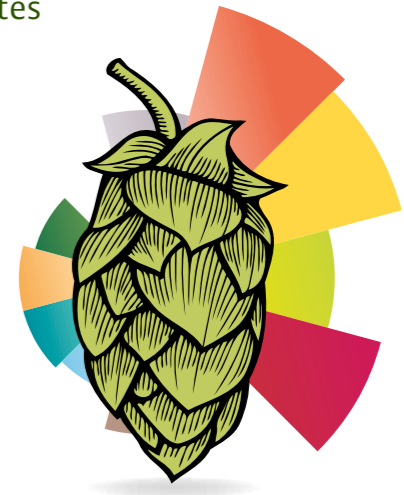
Growing area	United States
Heritage	50,0 % Hallertau, 25,0 % US Tettnang, 25,0 % unknown
Alpha Acids*	11,0 - 13 %
Total Polyphenols	4,5 - 5,5 %
Myrcene	60,0 - 65,0 % Total Oils
Beta Acids	3,5 - 4,5 %
Total Oil	2,2 - 2,8 ml/100 g
Linalool	1,0 - 2,0 % Total Oils

* The alpha content is determined by means of spectrophotometric analysis.

All values for Citra® from the representative flavor component analysis can be found on pages 6 - 7

Citra®

United States



Key Flavors

- Jasmine
- Spicy
- Lychee
- Gooseberry
- Geranium

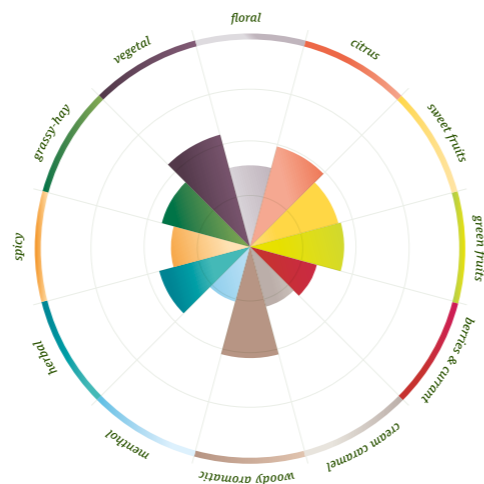
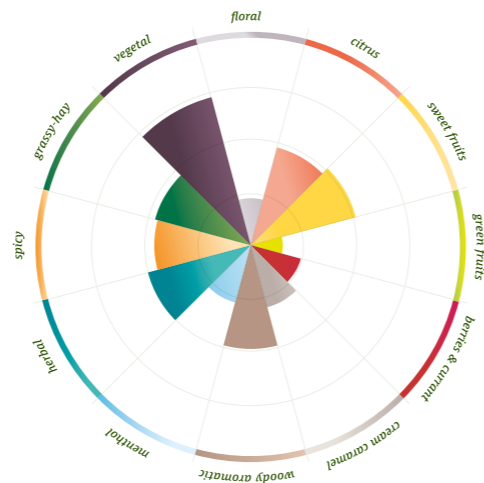


CROP 2019

You cannot talk about Columbus without mentioning some of its vegetal notes. Those are also present 2019 – leek and onion aromas that can possibly be transformed into fruity aromas in the brewing process. But peppery, curry and herbal notes can also be identified.

AROMA CHARACTERISTICS

The outstanding feature of these cultivars is their high aromatic density. Sweet fruit and floral, cool, citrusy and ethereal characteristics interact perfectly, thus giving the hops their special flavor profile.



CTZ (Columbus, Tomahawk and Zeus) is the most widely grown variety combination in the USA. The current Super High Alpha varieties, have the same female parent as Nugget, making them at least half sisters to Nugget.

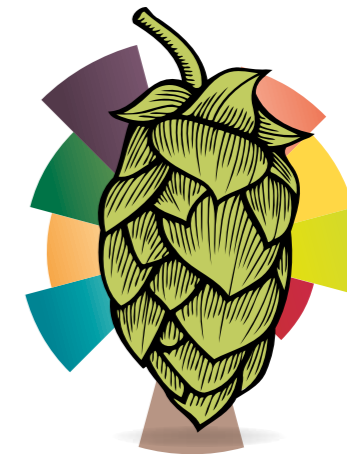
ANALYSIS VALUES

Growing area	United States
Heritage	Daughter of Nugget
Alpha Acids*	15,0 - 17,0 %
Total Polyphenols	no data
Myrcene	50,0 % Total Oils
Beta Acids	4,5 - 5,0 %
Total Oil	2,5 - 3,5 ml/100 g
Linalool	0,2 % Total Oils

* The alpha content is determined by means of spectrophotometric analysis.

Columbus

United States



Key Flavors

- Orange Peel
- Curry
- Vanilla Cream
- Lemongrass

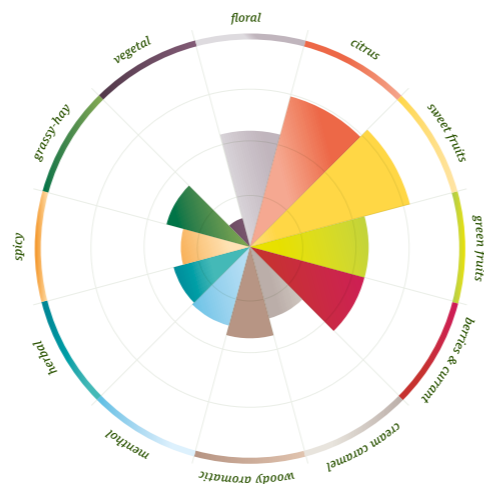
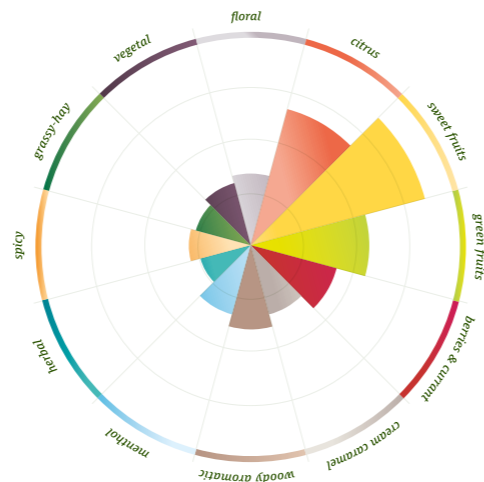


CROP 2019

Ekuanot® is known for distinct grapefruit and orange flavors but also distinctive sweet fruit aromas. For the crop 2019 the determining flavors are strawberry, guava, gooseberry and orange. Some woody, green-grassy and peppery flavors round off the profile.

AROMA CHARACTERISTICS

These hops are fruity to the core and reminiscent of an exotic cocktail. Grapefruit, lemongrass and mandarin lend tangy accents to ripe guava, lychee, mango, pineapple and passion fruit. Green fruits, such as gooseberries, apple and grapes, round off the flavor profile.



Like the two very successful hops Citra® and Mosaic®, Ekuanot® (HBC 366) was also bred by the Hop Breeding Company. The name Ekuanot® is evocative of "equinox", the term used for the two days of the year on which day and night have the same number of hours. This hop variety has a certain similarity to the equinox in that it appears lighter green as a young plant. The older it gets, the darker its green gets - day and night, light (green) and dark (green) are evenly matched.

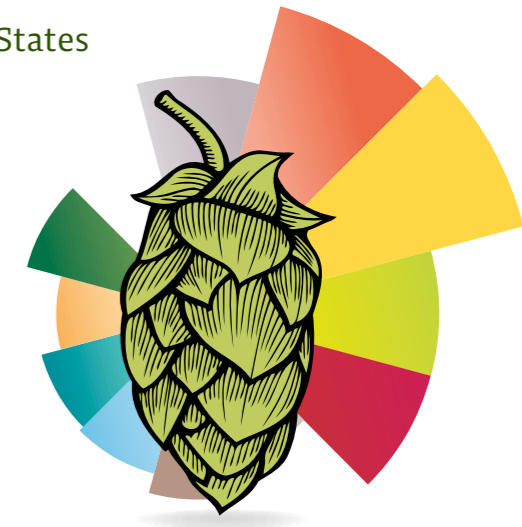
ANALYSIS VALUES

Growing area	United States
Heritage	no data
Alpha Acids*	14,5 - 15,5 %
Total Polyphenols	no data
Myrcene	30,0 - 45,0 % Total Oils
Beta Acids	4,5 - 5,5 %
Total Oil	2,5 - 4,5 ml/100 g
Linalool	no data

* The alpha content is determined by means of spectrophotometric analysis.

Ekuanot®

United States



Key Flavors



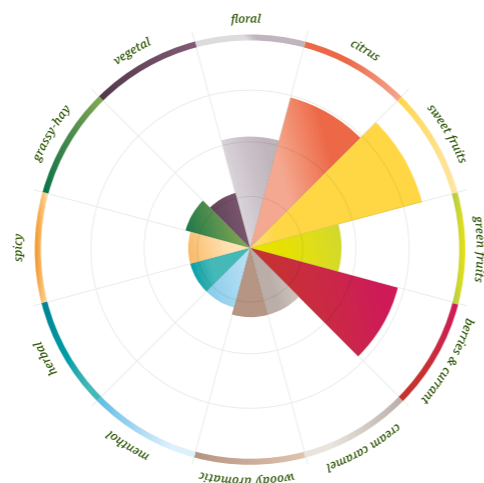
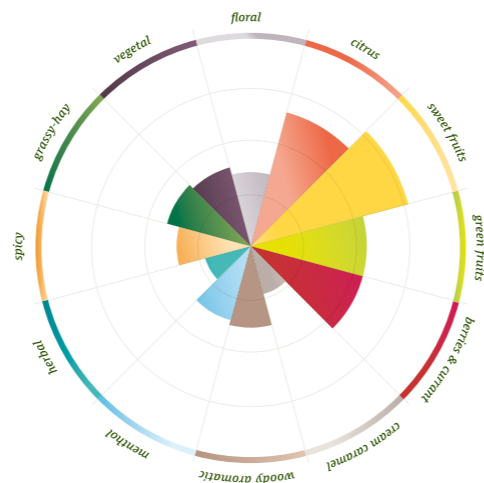
USA

CROP 2019

In almost no time, Mosaic® has become one of the most famous hops, predominantly due to its extreme fruitiness. Crop 2019 shows us the full potential of this hop variety. Passion fruit, mango, peach, banana and exotic fruit salad go hand in hand with green fruits like apple and pear, but also blackcurrant. In this composition, everything else plays a secondary role.

AROMA CHARACTERISTICS

Mosaic®'s overall flavor profile is defined by citrus notes of lime and mandarin, green fruits such as gooseberry, vegetal and green aromas such as onion, tomato leaves and red pepper, and cassis and peach. These are complemented by spicy notes of curry, chilli and myrrh.



Mosaic® is an aroma hop developed by the Hop Breeding Company and released in 2012. Mosaic® is the daughter of Simcoe® and a Nugget-derived-male.

ANALYSIS VALUES

Growing area	United States
Heritage	Simcoe® x m. Nugget
Alpha Acids*	11,5 - 13,5 %
Total Polyphenols	no data
Myrcene	47,0 - 53,0 % Total Oils
Beta Acids	3,2 - 3,9 %
Total Oil	1,0 - 1,5 ml/100 g
Linalool	no data

* The alpha content is determined by means of spectrophotometric analysis.

All values for Mosaic® from the representative flavor component analysis can be found on pages 6 - 7



Mosaic®

United States



Key Flavors



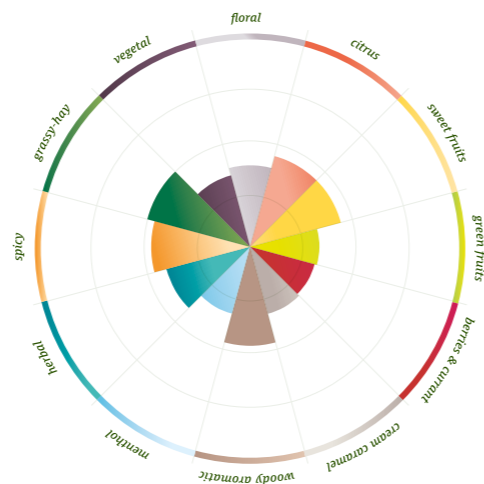
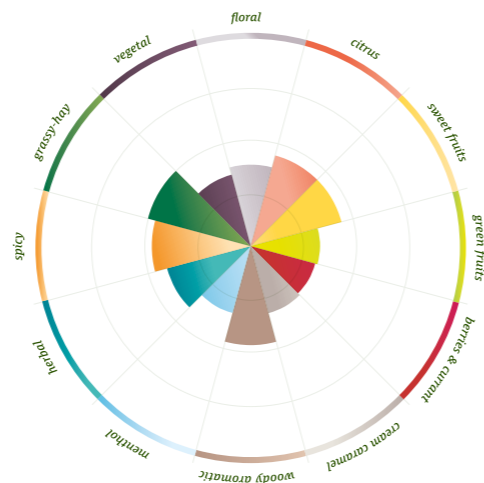


CROP 2019

In contrast to many other US varieties, the focus of Pahto's aroma is not on the fruity side but in the categories woody, green-grassy and spicy. In crop 2019, special earthy and resin-like aromas play a role together with aromas of plum jam.

AROMA CHARACTERISTICS

Pahto is a high alpha variety, which was developed for efficient bittering and has a very pleasant bitterness. Its aroma profile encompasses herbal, earthy, woody, and resinous notes, with some hints of fruit.



Pahto is a high alpha variety with a pleasant mild aroma. It offers both high alpha and crop yields and good storage stability and is resistant to powdery mildew. It was bred by the Hop Breeding Company from a female breeding line with similar properties and an "English gentleman" father - a breeding line from Wye College in Kent, UK.

ANALYSIS VALUES

Growing area	Vereinigste Staaten
Heritage	female HBS breeding line and male breeding line from Wye Collage in Kent, UK
Alpha Acids*	17,0 - 20,0 %
Total Polyphenols	no data
Myrcene	48,0 - 52,0 % Total Oils
Beta Acids	4,5 - 6,0 %
Total Oil	1,0 - 2,0 ml/100 g
Linalool	1,0 % Total Oils

* The alpha content is determined by means of spectrophotometric analysis.

Pahto

Vereinigste Staaten



Key Flavors

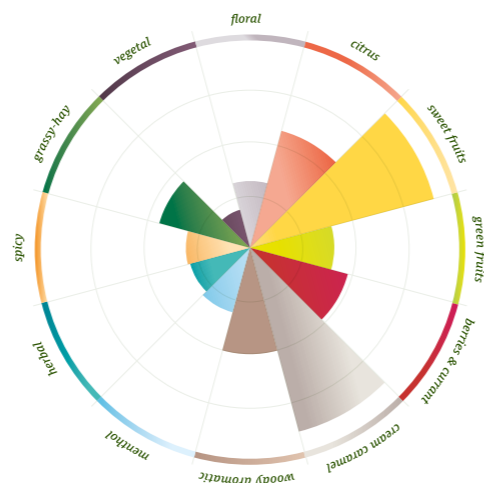
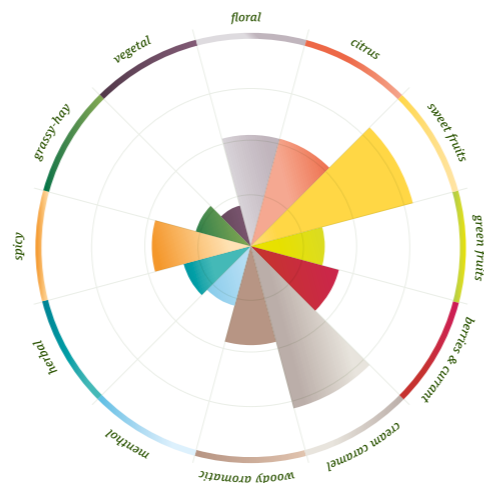


CROP 2019

How many flavors can fit into one hop variety? This is a question you could probably ask Sabro™, our shooting star from the US. In crop 2019, the high intensity of grapefruit, pineapple and mango determines the flavor profile. Together with pure coconut and caramel notes, but also blueberries, cognac and a hint of mint, this is the perfect cocktail for any beach bar.

AROMA CHARACTERISTICS

Sabro™ reliably contributes strong and complex fruit flavors to beer with notes of tangerine, pineapple and peach. It also has a remarkable creaminess, with strong coconut and vanilla aromas. These are rounded off by hints of cedar, dill and mint.



Sabro™ brand (HBC 438) was developed by the Hop Breeding Company and released in 2018. Sabro's pedigree is the result of a unique cross pollination of a female neomexicanus hop. With a robust brewing performance, Sabro™ proves to be a strongly expressive hop that translates its flavor incredibly well into beer.

ANALYSIS VALUES

Growing area	Vereingte Staaten
Heritage	cross pollination of a female neomexicanus hop and YCR 123
Alpha Acids*	12,0 - 16,0 %
Total Polyphenols	no data
Myrcene	40,0 - 55,0 % Total Oils
Beta Acids	4,0 - 7,0 %
Total Oil	2,5 - 3,5 ml/100 g
Linalool	1,0 % Total Oils

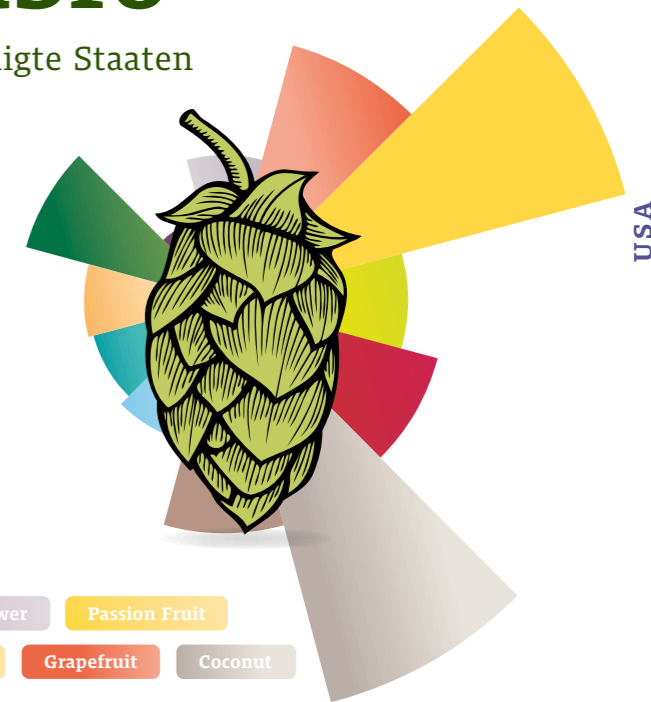
* The alpha content is determined by means of spectrophotometric analysis.

All values for Sabro™ from the representative flavor component analysis can be found on pages 6 - 7



Sabro™

Vereingte Staaten



Key Flavors



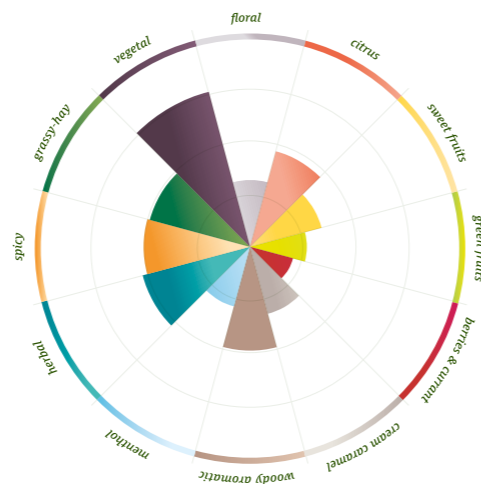
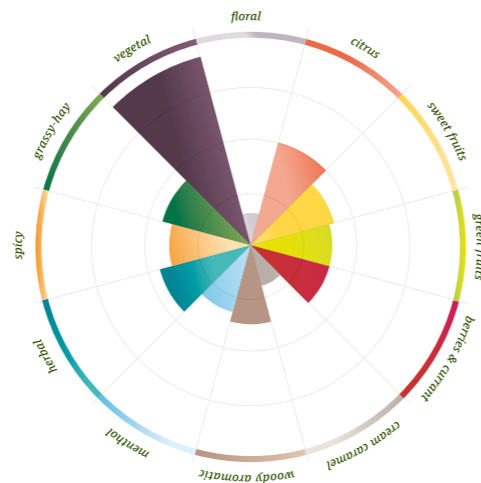


CROP 2019

2019 Summit® can be described as a walk through the vegetable patch, with an abundance of leek and celery. Beyond this vegetable cloud, there is also some fruitiness, like white wine grapes and several herbs, such as oregano and fennel.

AROMA CHARACTERISTICS

Summit® displays green, vegetal and spicy components such as tomato leaves, onion, aniseed and marjoram, coupled with woody notes of incense and sulphur. Citrus elements such as grapefruit, fruity cassis and floral lily-of-the-valley subtly round off the overall picture.



Summit® is a dwarf high alpha variety bred by the American Dwarf Hop Association and released in 2003. This hop variety has an unusually high alpha acid content, excellent storage stability and powdery mildew resistance.

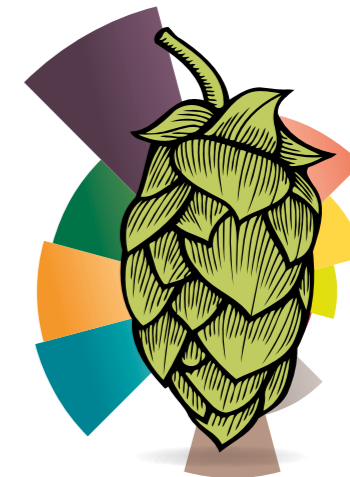
ANALYSIS VALUES

Growing area	United States
Heritage	bred from Nugget
Alpha Acids*	16,0 - 18,0 %
Total Polyphenols	no data
Myrcene	35,0 - 50,0 % Total Oils
Beta Acids	4,0 - 6,0 %
Total Oil	1,5 - 2,5 ml/100 g
Linalool	no data

* The alpha content is determined by means of spectrophotometric analysis.

Summit®

United States



Key Flavors

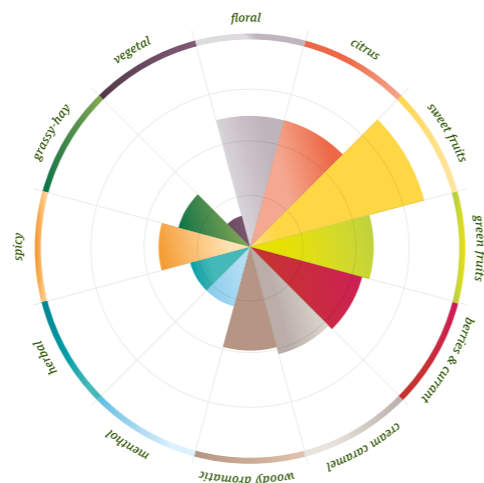
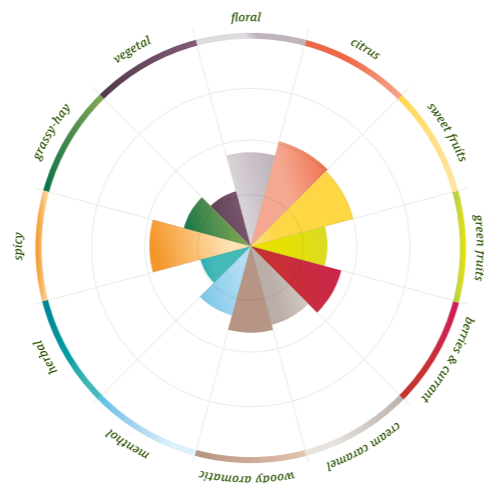


CROP 2019

Although sweet fruits like to dominate the aroma profile of Ella™, this crop has retained its unique floral character. Distinct notes of geranium combine with a fruitiness made up of peach and apricot, but also lemon notes and berry notes, such as strawberry and currants.

AROMA CHARACTERISTICS

The distinctly floral aromas of this variety are unrivalled. In the raw hops, there is a predominance of aromas ranging from spicy and woody to vegetal, such as fennel, tarragon and lavender. Distinct overtones of grapefruit, citrus and bergamot complete the overall impression.



Ella™ is a new aroma variety with strong growth characteristics. It produces medium-sized cones and is a medium to late-maturing variety. Although Ella™ is reminiscent of noble European varieties, it differs significantly from them in its characteristics and offers an interesting contrast to the many modern hop varieties that are characterised by citrus and tropical fruit aromas.

ANALYSIS VALUES

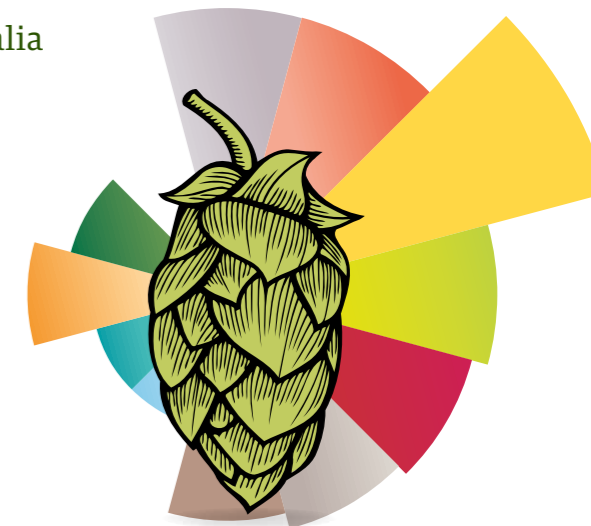
Growing area	Australia
Heritage	Australian breeding line
Alpha Acids*	13,3 - 16,3 %
Total Polyphenols	no data
Myrcene	33,0 - 43,0 % Total Oils
Beta Acids	4,0 - 4,5 %
Total Oil	2,4 - 3,4 ml/100 g
Linalool	0,5 - 0,6 % Total Oils

* The alpha content is determined by means of spectrophotometric analysis.



Ella™

Australia



Key Flavors

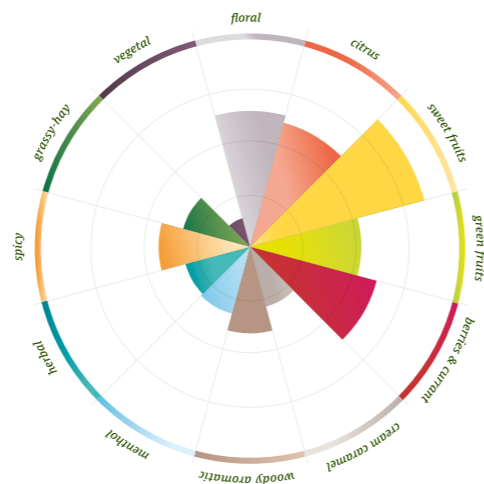
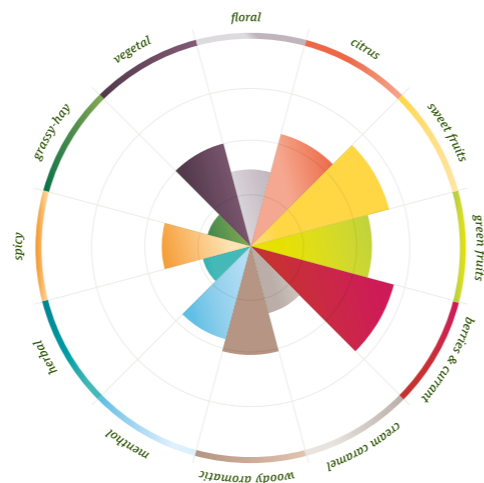


CROP 2019

We know Enigma™ as possessing distinctly floral aroma characteristics. In this crop, however, the floral aroma is only weakly expressed. This year, the impact of the sweet fruit aroma and also the strongly expressed blackcurrant aromas dominate the overall profile.

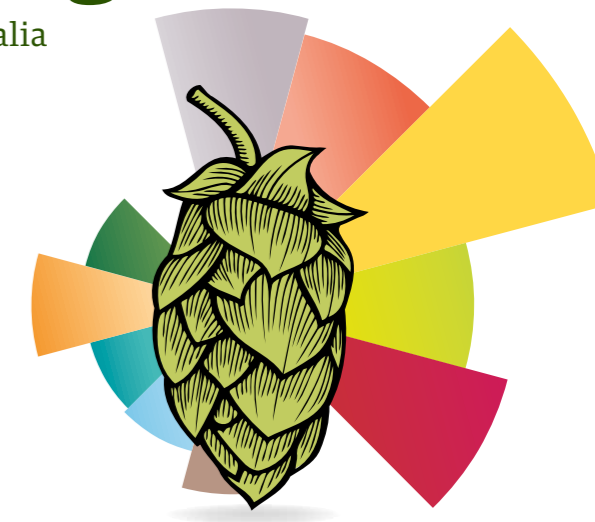
AROMA CHARACTERISTICS

These hops are just as intense as a good glass of red wine: full-bodied, elegant and fruity. Temptingly cloaked in tangy berries such as cassis, blackberry and gooseberry, with an exotic scent of quince, passion fruit and pineapple.



Enigma™

Australia



Enigma™, a hop variety from our hop breeding programme, is the latest variety from Hop Products Australia. Enigma™ is a descendant of Tettnang and was released in 2014.

Analysis values

Growing area	Australia
Heritage	Heritage of Tettnang Tettnanger
Alpha Acids*	13,5 - 16,5 %
Total Polyphenols	no data
Myrcene	20,0 - 35,0 % Total Oils
Beta Acids	4,8 - 6,4 %
Total Oil	2,4 - 3,0 ml/100 g
Linalool	0,3 - 0,4 % Total Oils

* The alpha content is determined by means of spectrophotometric analysis.

Key Flavors

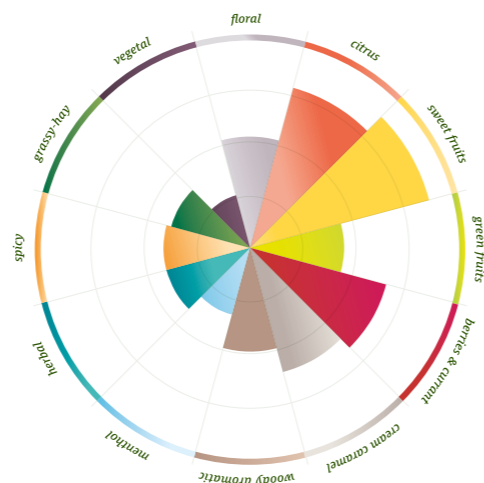
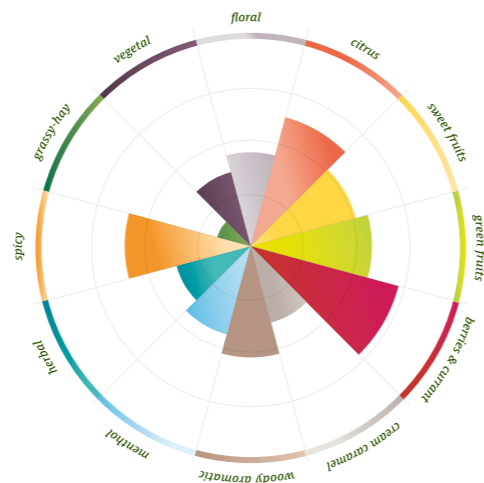


CROP 2019

Crop 2019 finds the hop variety Galaxy® very true to type with nice expressive aromas. All fruity categories are intensively pronounced, specifically notes like blueberry, peach and blood orange. Green fruit notes such as gooseberry are also important. A nice background of woody, herbal and spicy flavors rounds off the aroma profile.

AROMA CHARACTERISTICS

Galaxy® contributes prominent citrus, passion fruit and peach aromas when it is added to the boil late. Its aroma is defined by spicy components, such as aniseed and fennel, in a fruity combination with cassis, blueberry, blackberry and raspberry. In addition, notes of gooseberry can also be detected.



The Australian hop variety Galaxy® is a high alpha dual purpose seedless cultivar with a marked and unique hop aroma. It was bred by Hop Products Australia and is currently grown in Victoria and Tasmania. Due to its impressive flavors, the variety Galaxy® should be classified as a flavor hop.

ANALYSIS VALUES

Growing area	Australia
Heritage	25 % Perle + Australian breeding line
Alpha Acids*	11,0 - 16,0 %
Total Polyphenols	no data
Myrcene	33,0 - 42,0 % Total Oils
Beta Acids	5,0 - 6,5 %
Total Oil	2,4 - 2,7 ml/100 g
Linalool	0,5 - 0,7 % Total Oils

* The alpha content is determined by means of spectrophotometric analysis.

All values for Galaxy® from the representative flavor component analysis can be found on pages 6 - 7



Galaxy®

Australia



Key Flavors

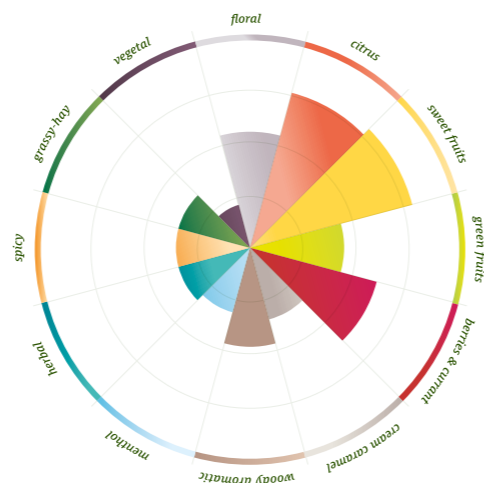
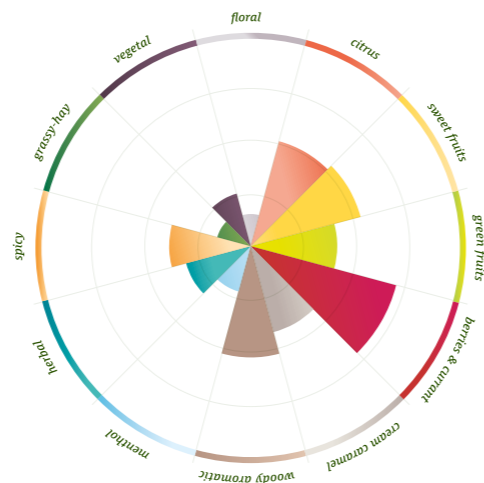


CROP 2019

Topaz™ 2019 carries earthy, spicy notes of tobacco, eucalyptus and cardamom. In addition, there is a creamy note of vanilla and yoghurt. But of course there is also a basket of fruits: grapefruit, blueberries, blackberries, passion fruit, blackcurrants and gooseberries.

AROMA CHARACTERISTICS

This cultivar has the characteristic earthy notes of old English hop varieties. The flavor profile is characterised by fruity aromas of blackberries, gooseberries, blueberries and currants, complemented by sweet passion fruit notes and woody tobacco nuances.



Topaz™ was originally selected as a seedless high alpha hop, mainly for extract production, but recent work has shown it to have excellent flavor potential.

ANALYSIS VALUES

Growing area	Australia
Heritage	Australian breeding line
Alpha Acids*	15,5 - 18,0 %
Total Polyphenols	no data
Myrcene	25,0 - 43,0 % Total Oils
Beta Acids	6,0 - 7,0 %
Total Oil	1,7 - 2,2 ml/100 g
Linalool	0,3 - 0,6 % Total Oils

* The alpha content is determined by means of spectrophotometric analysis.



Topaz™

Australia



Key Flavors

Grapefruit

Spicy

Blueberry

Passion Fruit

Blackberry

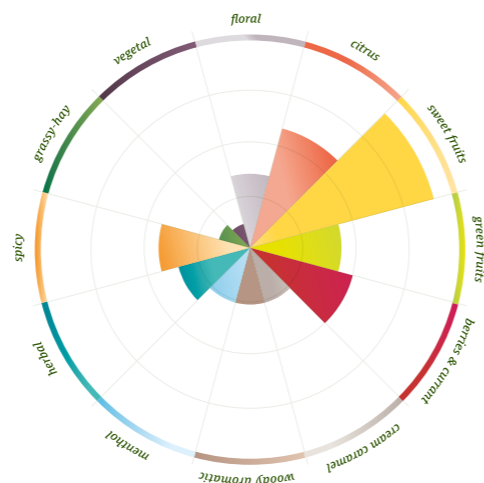
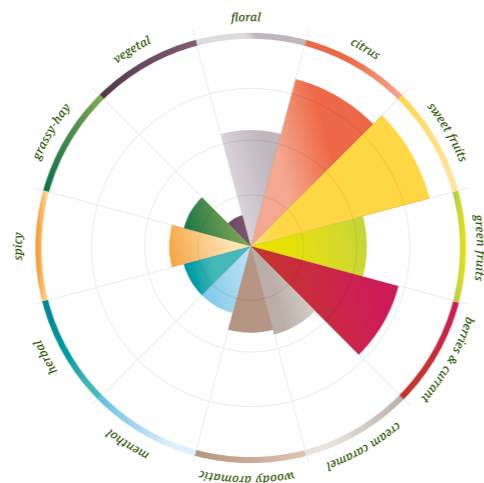


CROP 2019

Vic Secret is an explosion of flavors – citrus fruits, ripe sweet fruits, ripe pears, blackcurrants, honeydew melon, and fresh ginger, but also bitter chocolate, matcha-tea, barrique flavors and dried fruits. Refined with a floral bouquet of roses and lilies.

AROMA CHARACTERISTICS

The aroma profile of this cultivar is strongly characterised by green fruits, such as gooseberries and quince, sweet candied fruits, citrus notes of grapefruit and red berries, such as strawberries. Pineapple and passion fruit are also particularly prominent. The overall aroma profile is rounded off with intense floral notes of rose and apple blossom.



The story of Vic Secret goes back to the year 2000: it was planted as a seedling and advanced through the breeding programme with great strides until the moment everyone had been waiting for finally arrived with its release in 2010. This cultivar has only been in commercial production since 2013 and is still an insider's tip, as its name suggests.

ANALYSIS VALUES

Growing area	Australia
Heritage	cross between an Australian high alpha variety and a male cultivar from the UK
Alpha Acids*	14,0 - 17,0 %
Total Polyphenols	no data
Myrcene	38,0 - 41,0 % Total Oils
Beta Acids	6,7 - 7,8 %
Total Oil	2,2 - 2,8 ml/100 g
Linalool	0,2 - 0,6 % Total Oils

* The alpha content is determined by means of spectrophotometric analysis.

All values for Vic Secret from the representative flavor component analysis can be found on pages 6 - 7

Vic Secret

Australia



Key Flavors





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