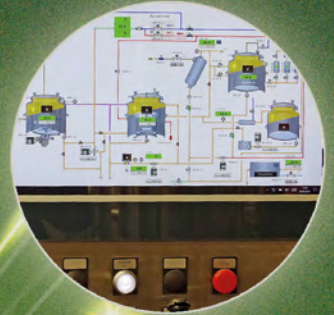


THE BARTH REPORT



HOPS 2018/2019

BARTH-HAAS GROUP

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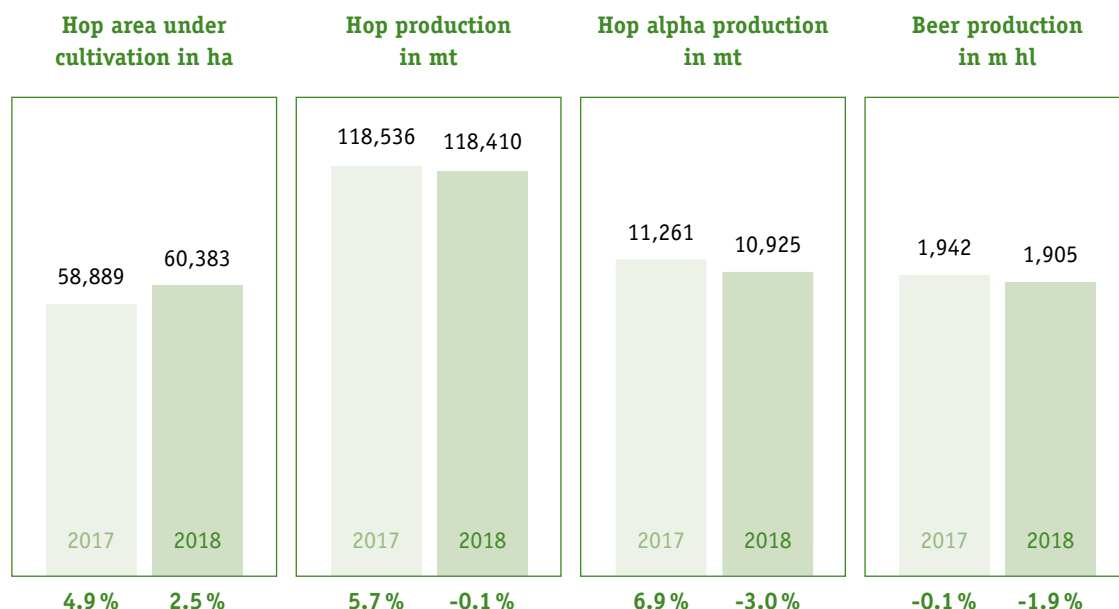
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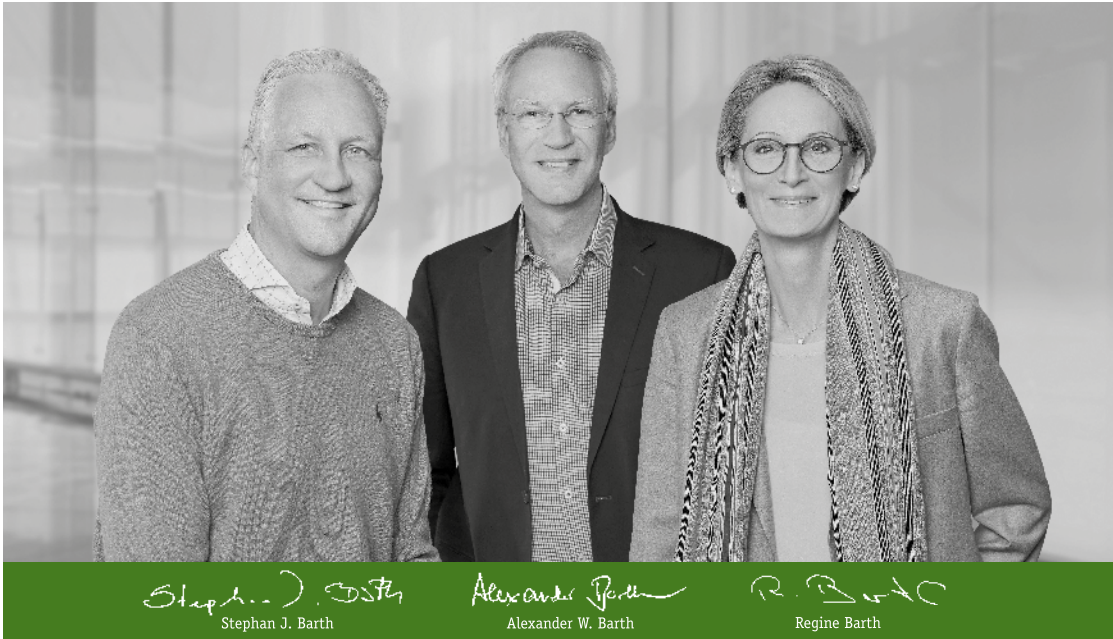
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WORLD MARKET BASIC DATA





Stephan J. Barth

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Regine Barth

“Nothing in the history of life is more constant than change.”

Charles Darwin

The first snapshots of a black hole; the production of a human heart on a 3D printer; a plane with a wingspan of 117 metre – there’s no doubt about it: we live in exciting times. Hardly a day passes without news of ground-breaking inventions and unprecedented discoveries. Members of the young generation are referred to as digital natives representing an age group that was born in the digital age. While digitalisation arouses euphoria on one side, it is met with cultural pessimism on the other. Will algorithms one day replace human creativity?

Of course, we don’t know that either but what we do know is that this year we are celebrating our 225th company anniversary – and the fact that Joh. Barth & Sohn is managed today by the 7th and 8th generations of the founding family. In other words, our company has no shortage of tradition. The company was founded in Betzenstein, near Nuremberg, in 1794. In that year, our great-great-great-great-grandfather Johann Barth, a master tailor and grocer, opened up a new and promising line of business for his son Georg in the hop trade. Georg now added hops to the load in his covered wagon and offered them to the tiny breweries in the immediate vicinity. That is how the history of our company began, and this sense of history will be passed on to future generations. However, this certainly does not mean that the values of the past still apply today. Ever since, each generation of partners and employees alike has shaped this hop trading company and has adapted to the changing political, economic and social climate. No matter how tranquil the picture of Georg Barth on his covered wagon laden with hop bales may

seem, things were anything but romantic then. Only five years before, the French Revolution had caused huge upheaval throughout Europe. Not even their little Franconian village remained unscathed – Johann Barth died on the very day that soldiers of Napoleon’s army occupied Betzenstein in 1796. One of the consequences of the revolution, however, was a strengthening of the middle class – no longer did social barriers prevent personal advancement. The middle classes were allowed to participate politically and in 1833 succeeded in creating a single economic area in Germany. Hundreds of customs barriers were removed and a great number of different currencies were abolished. The Barth Brothers could now extend their trading radius as far as the North and Baltic Seas and the Alps. Nor did time stand still in Nuremberg. The city developed into an industrial centre. In the factories, turbines were driven by the recently invented steam engine, and in 1835 the first railway journey in Germany was made between Nuremberg and Fuerth. When the sulphur ban was first lifted from hops for export in Central Franconia in 1858, there was no holding Johann Barth, the founder’s grandson and the managing partner at that time, in Betzenstein. He relocated to Nuremberg and registered the company Joh. Barth & Sohn there. By then, trains were travelling from the city’s railway station to the important cities and ports of Europe. In 1886 Joh. Barth & Sohn shipped hops to New York for the first time.

A lot of history and lots of stories. A lot of change and a lot of movement. These are the constants in our eventful 225-year history. And they connect us with our predecessors. We have remained true to their adaptability and are always open to new things. And we have no shortage of ideas and visions for the future.



Reporting period: 1 June 2018
to 31 May 2019

The upheaval witnessed in the world order for some years now continues unabated. The blessings of global free trade are increasingly being questioned. The headlines are dominated by the trade war between the **USA** and **China** which is having repercussions around the world. Political relations between the **USA** and **Russia** – and **Iran** in particular – can still only be described as tense or even extremely tense. Hardly any countries are unaffected by these conflicts either. The deep rifts dividing society in the **USA** and the **United Kingdom**, to mention but two outstanding examples, continue to raise doubts as to the ability of governments to successfully tackle the domestic policy issues that are truly important for the future such as education, infrastructure and climate change.

In May 2019, one year after US President **Donald Trump** had announced his country's unilateral withdrawal from the nuclear treaty with **Iran** and decreed economic sanctions, President **Hassan Rohani** threatened to resume uranium enrichment beyond the limits agreed in the treaty. Although the cosignatories of the nuclear treaty, the UN Security Council members **China**, **Russia**, **France**, the **United Kingdom** and **Germany**, upheld the treaty, they were unable to compensate for the effects of the US sanctions.

Venezuela, the country with the world's largest oil reserves has become a flashpoint for geopolitical and economic interests. In May 2018, President **Nicolás Maduro** was re-elected in a controversial election. Despite repeated objections at home and abroad, Maduro returned to office. On 5 January 2019, **Juan Gerardo Guaidó** was elected president of the opposition-dominated National Assembly. On 23 January 2019, after the parliament had pronounced Maduro's re-election unlawful, Guaidó proclaimed himself interim president of Venezuela and demanded Maduro's resignation and new elections on the basis of constitutional law. Guaidó is supported by the USA, South America's right-wing parties and the EU. Maduro, on the other hand, has the military, Russia, China, Turkey and Iran on his side.

In **Brazil** the ultra-right-wing **Jair Messias Bolsonaro** won the run-off in the presidential election against the Democrat **Michel Temer** in October 2018.

In **Italy** the populist **Five Star Movement** and the extreme right-wing **Lega** agreed on the independent lawyer **Giuseppe Conte** as the new Prime Minister and thus formed a new government on 1 June 2018. On the same day the Spanish parliament passed a motion of no confidence in the Conservative head of government **Mariano Rajoy**, whereupon King **Felipe VI** swore in

Pedro Sánchez as Prime Minister. Having failed to find a majority in parliament for its budget draft, the PSOE minority government called an early election which took place on 28 April 2019. By the end of the reporting period no government had been formed due to unresolved majority issues.

In the presidential election in **Turkey** in June 2018, the incumbent **Recep Tayyip Erdogan** won an absolute majority. This election concluded the process of introducing the presidential system desired by Erdogan.

The state of emergency declared by Erdogan following the attempted coup in July 2016 was lifted in July 2018.

In **Sudan** and **Algeria** in April 2019, demonstrators drove the countries' long-standing rulers **Umar Hasan Ahmad al-Bashir** and **Abdelaziz Bouteflika** from office. Demands for fundamental change towards greater democracy in both countries is at risk of failure in face of opposition from the powerful military.

In **Libya**, the warlord and self-appointed field marshal **Khalifa Haftar** controls the east of the country with his Libyan National Army, an alliance of ex-members of Gaddafi's armed forces, Salafists and mercenaries. His objective is to overthrow the internationally recognised **Libyan** government. In April 2019 he launched an offensive on the capital city of Tripoli, adding yet another chapter to the civil war in Libya.

The war in **Afghanistan** is characterised by a succession of interrelated armed conflicts. Most of the terror attacks carried out worldwide occur in Afghanistan.

A series of attacks in **Sri Lanka** in April 2019 demonstrated the new maxim of the **Islamic State (IS)**. Having been fought and largely defeated by an international alliance instead of pursuing its original goal to establish its own califate, the IS now has the following objective: unadulterated terror – anywhere and for its own sake.

In 1987 the USA and the then Soviet Union signed the Intermediate-Range Nuclear Forces Treaty. Both sides committed themselves to dispensing with land-based ballistic missiles and cruise missiles with a range of between 500 and 5,500 kilometres. At the same time the treaty forbade the production and testing of such systems. Accusing **Russia** of failing to abide by the treaty, the **USA** announced in February 2019 that it was going to withdraw from the treaty. In the end, the two sides suspended it. A period of six months' notice remained in which the treaty could still be salvaged.



Reporting period: 1 June 2018
to 31 May 2019

Brexit

In a referendum on 23 June 2016, a narrow majority of British voters voted in favour of the **United Kingdom** leaving the **European Union** ("Brexit"). On 25 November 2018, the heads of state and government of the remaining 27 EU member states approved the Brexit treaty package negotiated with representatives of the government of Prime Minister **Theresa May**, with an exit date originally planned for 29 March 2019. The treaty included the future rights of EU citizens in the United Kingdom and those of Britons in the EU, the financial settlement due from the UK, the agreements regarding the Northern Ireland question and the political declaration regarding the key parameters for future cooperation. All that was needed for the pact to come into effect was the consent of the British parliament. Because the members of parliament of the United Kingdom were unable to agree on a solution in a number of votes, it was agreed with the EU member states that the withdrawal date be extended initially to 12 April 2019 and then again to 31 October 2019, although an earlier withdrawal, or even a complete revocation of the withdrawal notice, would remain possible. The decision still remains completely in the hands of the British parliament. Unfortunately, however, this parliament has not proved capable of resolving this key issue affecting Europe as a whole.

Migration policy

The EU and its member states are trying to find an effective migration policy. However, the opinions of the individual member states differ greatly with regard to the form that this migration policy should take. Nevertheless comprehensive steps have been taken in response to the pressure of migration. According to data from the United Nations' International Organization for Migration (IOM), a total of 133,000 people came to Europe in 2018. Since the peak of the migration crisis in 2015, the number of irregular entries to the EU has decreased by more than 90%.

European Stability Mechanism (ESM)

As part of the reform of the currency union, the EU finance ministers agreed that in the future they would deploy the **ESM**, which is intended to come to the aid of overindebted states with loans and guarantees, earlier. In addition, together with the EU Commission, the ESM should be more closely involved in managing support programmes.

European Parliament election

Elections to the **European Parliament** were held in the member states of the European Union from 23 to 26 May 2019. In spite of dramatic losses, the Christian Democrats who are organised as the European People's

Party (EPP) remained the largest parliamentary group. The Socialists and Democrats (S&D) also suffered significant losses. For the first time, the EPP and S&D together fell short of a majority of seats in the EU parliament. The third-strongest group is ALDE, the new alliance made up of Liberals and the French En Marche movement. The right-wing populist parties were able to increase their share of the seats, but the pro-EU parties still jointly hold an overwhelming majority in the European Parliament.

The Common Agricultural Policy (CAP)

On 1 June 2018, the **European Commission** put forward three legislative proposals regarding the **Common Agricultural Policy (CAP)** after 2020:

- Amending Regulation (on the amendment of the Common Market Organisation for Agricultural Produce (CMO); Regulation (EU) No. 1308/2013)
- Regulation on CAP strategy plans
- CAP horizontal regulation (on the financing, management and monitoring of the CAP)

These three proposals are intended to enable the CAP to better master current and future challenges such as climate change or farm successions. At the same time, they are intended to support European farmers in making their industry sustainable and competitive.

The following nine objectives are intended to enable the CAP to ensure the supply of high-quality foods and support the European farming model:

- Fair incomes for farmers
- Increased competitiveness
- Restoration of a balance of power in the food chain
- Climate protection measures
- Environmental care
- Preservation of countryside and biodiversity
- Support for farm successions
- Dynamic rural areas
- Protection of food quality and health

The European Commission is proposing a more flexible system by means of which the operation of the CAP is to be simplified and modernised. There will be a change of focus from observing regulations to achieving results and performance.

The individual countries are to present strategy plans in which they will show how they intend to implement the nine EU-wide objectives, while at the same time taking the particular needs of their farmers and rural communities into account.

EUROPEAN UNION (EU)

In addition, this new mode of operation will include:

- Streamlining administrative processes: only one strategy plan comprising direct payments, development of rural areas and sectoral strategies is to be submitted per country.
- Simplification of environmental protection: each country is to adapt their environmental and climate protection measures to the respective local situation within the framework of standards and objectives at EU level.
- Simplification of support for young farmers: the single strategy plan will enable coherent measures to be taken to support farm successions and will include both direct payments and the development of rural areas. In addition, young farmers will be given easier access to supplementary sources of

income and support for farm start-ups, as the eligibility criteria for EU subsidies will be eased.

The Romanian EU Council Presidency has prioritised the goal of achieving at least the adoption of a so-called partial general approach by the Council by June 2019. This aim is hardly likely to be achieved. In mid-March 2019, several delegations to the Agricultural Council in Brussels expressed doubts that important agricultural policy decisions could be made prior to agreement being reached on the Multiannual Financial Framework (MFF) for the period 2021 to 2027. Agreement on funding from 2021 is planned for the autumn of 2019.

At the time of going to press it was not clear how the EU agricultural policy would affect the farming of hops as a speciality crop.

ECONOMIC SITUATION

*Reporting period: 1 June 2018
to 31 May 2019*

Faced with growing trade and finance crises, the global economy achieved less dynamic growth in 2018 than originally forecast.

*GDP data: IMF World Economic
Outlook, April 2019*

Gross domestic product (GDP) worldwide grew by 3.6% in 2018, compared with 3.8% the year before. GDP in the **Eurozone** was considerably weaker, amounting to 1.8% compared with 2.4% in 2017 and mainly influenced by **Germany** with a growth of 1.5% (2017: 2.5%) and **France** with 1.5% (2017: 2.2%). **China** was also unable to sustain the growth rate of 6.8% seen in 2017, managing only 6.6% in 2018, its lowest growth in nearly three decades. In the **USA**, on the other hand, GDP rose from 2.2% to 2.9% in 2018. This development was mainly attributable to the massive tax cuts implemented by President Trump.

Since 2018 the **USA** and **China** have imposed special tariffs on each other. In mid-May 2019 the USA raised the import duties on Chinese goods worth 200 billion US dollars from 10 to 25 per cent. China announced that it in turn would increase its existing duties on American goods. The USA is keen to reduce its trade deficit and is demanding improved market access and more effective protection against product piracy and compulsory technology transfer. The USA is also critical of state support for Chinese companies claiming that this distorts competition. Failure of the trade negotiations between the two largest economies would have far-reaching adverse consequences for the entire world economy.

The trade dispute between the **USA** and the **EU** is also intensifying. In response to duties being increased for goods imported into the USA from the EU, the EU

imposed retaliatory duties. Negotiations regarding future transatlantic trade relations are still ongoing, but their tone is becoming increasingly harsh.

The major central banks are taking different approaches to monetary policy. The benchmark interest rate of the **European Central Bank (ECB)**, for example, has remained unchanged at 0.00% and that of the **People's Bank of China (PBC)** at 4.35%. In contrast, the **US Federal Reserve (Fed)** raised its base rate by 0.25% each time in June, September and December 2018, finally bringing it to 2.5%. It has not adjusted rates further in 2019, though.

Due to uncertainty about the development of the world economy, there were constant ups and downs on the stock markets. German companies traditionally dependent on exports suffered throughout 2018 due not only to the trade dispute between the USA and China and the uncertainty surrounding Brexit but also to the budget dispute between the EU Commission and Italy. During the period under review, the **German Stock Index (DAX)** reached its highest level of 13,107 points on 14 June and its lowest level of 10,382 points (-21%) on 27 December. On 31 May 2019 it closed at 11,727. The **Dow Jones (DJIA)** reached the record level of 26,780 points on 2 October 2018. Less than two months later, on 21 December, it fell to its lowest level in the reporting period of 22,443 points (-16%). On 31 May 2019 it closed at 24,810.

During the period under review, the **euro to US dollar** exchange rate reached a peak of 1.1798 USD on 7 June 2018 and a low point of 1.1129 USD on 30 May 2019.

ECONOMIC SITUATION

In mid-August 2018 a barrel of Brent **crude oil** cost 71 USD. Then there was a sharp upturn leading to a price of 85 USD on 9 October. After that the price fell dramatically. By 28 December 2018 it had reached a low of 52 USD. However, the political environment was such that the oil price rose again. The reasons for this included unrest in Libya and the sanctions imposed on Iran by the USA. By the end of May 2019, the price was quoted at 65 USD.

In the **USA**, the Senate, the House of Representatives and the President were unable to reach agreement on the budget. The reason was the state funding demanded by **Donald Trump** for a wall on the border to Mexico. A government shutdown ensued, beginning on 22 December 2018 and lasting 35 days. It was the longest spending freeze in the history of the United States.

The **EU** and **Japan** reached agreement on a treaty creating the world's largest free-trade zone. Nicknamed "**JEFTA**" (Japan-EU Free Trade Agreement), the treaty came into effect on 1 February 2019 and encompasses

one third of world gross domestic product, with a value of goods totalling roughly 130 billion euros.

In the midst of a diplomatic crisis between **Turkey** and the **USA** in the summer of 2018, the Turkish lira collapsed. With economic output falling, the country went into a recession accompanied by high inflation. In **Venezuela** the decline of the oil group PDVSA, the backbone of the Venezuelan economy, brought about by the country's socialist leaders through years of mismanagement and corruption plunged the country into a deep economic crisis with hyperinflation.

Argentina also suffered from one of the world's highest inflation rates in 2018.

With its "New Silk Road" initiative, **China** aims to increase its power on land and sea. For this purpose, new ports, roads and railways are planned to open up trading routes all the way to Europe. This growing presence is leading to tensions, however – particularly in the South China Sea between China, Vietnam, Malaysia and the Philippines.

KEY DATA

		GDP growth (real)	Balance of payments in USD bn	Balance of trade in USD bn	Inflation rate Ø	Interest rate Ø*	Unemployment (as of 31.12.)
USA	2016	1.6%	-432.9	-751.1	1.3%	1.84%	4.9%
	2017	2.2%	-449.1	-807.5	2.1%	2.33%	4.4%
	2018	2.9%	-488.5	-891.3	2.4%	2.91%	3.9%
China	2016	6.7%	196.4	494.1	2.0%	4.90%	3.8%
	2017	6.8%	164.9	476.1	1.6%	4.90%	3.8%
	2018	6.6%	43.5	393.8	2.1%	4.90%	3.8%
Japan	2016	0.9%	197.1	50.9	-0.1%	-0.07%	3.1%
	2017	1.9%	191.8	44.0	0.5%	0.05%	2.8%
	2018	0.8%	170.1	11.3	1.0%	0.06%	2.4%
Germany	2016	2.2%	298.4	297.2	0.4%	0.13%	6.1%
	2017	2.5%	296.0	304.3	1.7%	0.35%	5.7%
	2018	1.5%	297.9	286.6	1.9%	0.40%	5.2%

Development of the key economic indicators for the world's four largest economies in the last three years.

The figures for 2016 and 2017 have been revised according to the latest statistics and subsequent recalculation.

**) Interest rate for 10-year bonds. China: Lending rate for long-term loans.*

Currency exchange rates

1 EUR equals (reference by ECB):

	on 31 May 2018	on 31 May 2019		on 31 May 2018	on 31 May 2019
Australia	1.5414 AUD	1.6136 AUD	Poland	4.3058 PLN	4.2843 PLN
China	7.4951 CNY	7.7045 CNY	Russia	72.5759 RUB	72.9053 RUB
United Kingdom	0.8768 GBP	0.8869 GBP	Switzerland	1.1526 CHF	1.1214 CHF
Japan	127.3300 JPY	121.2700 JPY	Czech Republic	25.7970 CZK	25.8160 CZK
Canada	1.5038 CAD	1.5115 CAD	USA	1.1699 USD	1.1151 USD

These exchange rates can only serve as an indication. They vary from bank to bank and are not binding.

WORLD BEER PRODUCTION 2017/2018

It is becoming increasingly difficult to obtain figures for beer output volume in individual countries. In addition, there are often significant differences in the production figures provided by different sources. The output volumes here, which in some cases are estimates, are based on close scrutiny of all available data and our own judgement.

All figures in 1,000 hl

* Estimate

** Ranking by output quantity

Italics: corrections of figures for 2017 as stated in last year's report. These figures only became known after going to press or were subsequently corrected.

Europe			
R**	Country	2017	2018
5	Germany	93,013	93,652
6	Russia	74,400	77,470
9	United Kingdom	40,480	41,530 *
10	Poland	40,382	40,930
11	Spain	37,621	38,370
13	Netherlands	24,271	24,530 *
16	France	21,727	22,375
19	Czech Republic	20,322	21,272
20	Belgium	21,200 *	21,000 *
24	Ukraine	17,800	18,070
26	Romania	16,110	17,600
28	Italy	15,552	15,790 *
32	Austria	9,679	9,826
33	Turkey	9,067	9,552
35	Ireland	8,019	8,000 *
37	Portugal	6,990	6,757
38	Hungary	6,279	6,500 *
40	Denmark	6,060	6,100 *
43	Serbia	5,410	5,480 *
45	Bulgaria	5,020	5,100
48	Sweden	4,796	4,820 *
49	Belarus/ White Russia	4,442	4,664
56	Greece	3,800	3,800 *
57	Finland	3,812	3,740
58	Switzerland	3,467	3,603
59	Croatia	3,395	3,450 *
72	Norway	2,620	2,711
75	Lithuania	2,789	2,570 *
76	Slovakia	2,521	2,555 *
91	Slovenia	1,399	1,415 *
94	Estonia	1,369	1,275
101	Georgia	969 *	990 *
102	Bosnia- Herzegovina	950	960 *
104	Moldavia	947 *	925 *
109	Latvia	820	760 *
112	Macedonia	645	690
113	Albania	620 *	625 *
120	Cyprus	394	410
126	Montenegro	320	332
130	Luxembourg	291	291
135	Iceland	241	239
136	Armenia	201	236
143	Malta	170	181
	TOTAL	520,380	531,056

Australia/Oceania			
R**	Country	2017	2018
27	Australia	16,345	16,100
69	New Zealand	2,886	2,926
108	Papua New Guinea	780 *	800 *
138	Tahiti	210 *	210 *
139	Fiji Islands	200 *	210 *
146	New Caledonia	150	160 *
155	Solomon Islands	69 *	70 *
156	Samoa	64 *	66 *
168	Vanuatu	11 *	11 *
	TOTAL	20,715	20,553

America			
R**	Country	2017	2018
2	USA	218,336	214,607
3	Brasil	140,000 *	141,379
4	Mexico	110,100	119,800
15	Colombia	21,893	22,766
18	Canada	22,077	21,650
23	Argentina	18,856	19,140
29	Peru	14,365	14,480
34	Chile	8,418	8,670
39	Ecuador	5,950	6,320
47	Dominican Republic	4,800	4,950
52	Venezuela	7,195	4,297
55	Bolivia	3,820	3,845
61	Panama	3,350	3,360
65	Guatemala	3,000 *	3,010
68	Paraguay	2,990	2,995
74	Cuba	2,600 *	2,600 *
83	Costa Rica	1,720 *	1,720 *
86	Nicaragua	1,560 *	1,560 *
96	El Salvador	1,200 *	1,190
98	Honduras	1,050 *	1,050 *
99	Uruguay	1,010 *	1,012
103	Jamaica	950 *	950 *
106	Trinidad	860	860
107	Puerto Rico	820	800
123	Guyana	380	380
125	Belize	340 *	340 *
142	Haiti	198 *	195 *
147	Bahamas	150 *	150 *
148	Dutch Antilles	140 *	140 *
150	Suriname	100 *	100 *
152	Barbados	80 *	80 *
154	St. Lucia	75 *	75 *
158	Martinique	60 *	60 *
159	Aruba	55 *	55 *
161	St. Vincent	45 *	45 *
164	Grenada	30 *	30 *
165	St. Kitts	25 *	25 *
166	Antigua	20 *	20 *
167	Dominica	11 *	11 *
171	Cayman Islands	5 *	5 *
	TOTAL	598,634	604,722

Asia			
R**	Country	2017	2018
1	China	440,150	381,200
7	Japan	51,610	52,641
8	Vietnam	43,750	43,000
14	India	22,500 *	23,600
17	Philippines	20,000	22,200
21	South Korea	20,000	20,042
22	Thailand	20,773	19,279
36	Cambodia	6,500 *	7,000 *
42	Kazakhstan	5,629	5,920
44	Taiwan	5,638	5,467
51	Myanmar	4,500 *	4,500 *
54	Laos	3,800 *	3,900 *
64	Malaysia	3,100	3,100
71	Usbekistan	2,613	2,743 *
79	Indonesia	2,135	2,220
84	Singapore	1,630	1,630
89	Nepal	1,200 *	1,500
90	Sri Lanka	1,420 *	1,450 *
93	Israel	1,300 *	1,300 *
110	Iran	2,000 *	700
114	Mongolia	592	605 *
116	Hong Kong	500	540
117	Turkmenistan	560	520 *
119	Bhutan	350	450
121	Azerbaijan	389	405 *
122	Tajikistan	380 *	390 *
124	Bangladesh	380 *	380 *
127	Kirgistan	299	310 *
137	Lebanon	255 *	230 *
153	Jordan	72	76
163	Pakistan	30 *	30 *
170	Palestine	5 *	6 *
	TOTAL	664,060	607,334

Africa			
R**	Country	2017	2018
12	South Africa	32,320 *	31,350 *
25	Nigeria	17,500 *	18,000 *
30	Ethiopia	11,500 *	14,122
31	Angola	11,500 *	11,000 *
41	Cameroon	6,635 *	6,000
46	Kenya	5,500 *	5,000 *
50	Tanzania	4,500 *	4,500 *
53	Dem. Rep. of the Congo (Zaire)	4,560 *	4,200
60	Mosambique	3,100 *	3,400 *
62	Uganda	3,400 *	3,300 *
63	Ivory Coast	3,000	3,300
66	Zambia	2,500 *	3,000 *
67	Congo (Brazzaville)	3,000	3,000 *
70	Ghana	2,850 *	2,850 *
73	Namibia	2,700 *	2,700
77	Burundi	2,400 *	2,400 *
78	Zimbabwe	2,300 *	2,300 *
80	Burkina Faso	2,000	2,100
81	Rwanda	1,500 *	2,000
82	Tunisia	1,750	1,750
85	Algeria	1,300	1,600
87	Madagascar	1,500	1,550
88	Botswana	1,500 *	1,500 *
92	Gabon	1,400	1,350
95	Egypt	950 *	1,200 *
97	Benin	1,050 *	1,050 *
100	Malawi	1,000 *	1,000 *
105	Morocco	850	900
111	Togo	670	690
115	Chad	620	600
118	Lesotho	400 *	450 *
128	Mauritius	394	300
129	Guinea Conakry	300	300
131	Equatorial Guinea	270	270
132	Kingdom Eswatini	270 *	270 *
133	Central African Republic	260	260
134	Réunion	250 *	250 *
140	Sierra Leone	200 *	200 *
141	Senegal	200	200
144	Eritrea	180 *	180 *
145	Mali	160	180
149	Liberia	135	117
151	Seychelles	90 *	100 *
157	Niger	65 *	65 *
160	Guinea Bissau	45 *	45 *
162	Gambia	31	30
169	Cape Verde	8 *	8 *
	TOTAL	138,613	140,937

World total			
		2017	2018
	TOTAL	1,942,402	1,904,602

TOP 40 BREWERIES



The world's top 40 brewing groups as of 31 December 2018

Ranking	Brewery	Country	Beer output 2018 in mill. hl	Share of world beer production
1	AB InBev	Belgium	567.0	29.8%
2	Heineken	Netherlands	233.8	12.3%
3	China Res. Snow Breweries	China	121.0	6.4%
4	Carlsberg	Denmark	112.3	5.9%
5	Molson Coors	USA/Canada	96.6	5.1%
6	Tsingtao Brewery Group	China	80.3	4.2%
7	Asahi	Japan	57.9	3.0%
8	BGI / Groupe Castel	France	40.5	2.1%
9	Yanjing	China	38.0	2.0%
10	Efes Group	Turkey	31.8	1.7%
11	Grupo Petrópolis	Brasil	30.0	1.6%
12	Kirin	Japan	27.8	1.5%
13	San Miguel Corporation	Philippines	24.0	1.3%
14	Constellation Brands	USA	22.0	1.2%
15	Diageo (Guinness)	Ireland	20.0	1.1%
16	Saigon Beverage Corp. (SABECO)	Vietnam	17.0	0.9%
17	Singha Corporation	Thailand	12.9	0.7%
18	CCU	Chile	12.9	0.7%
19	Grupo Mahou - San Miguel	Spain	12.7	0.7%
20	United Breweries	India	12.5	0.7%
21	Radeberger Gruppe	Germany	11.8	0.6%
22	Damm	Spain	11.5	0.6%
23	Pearl River	China	10.7	0.6%
24	Beer Thai (Chang)	Thailand	9.0	0.5%
25	Suntory	Japan	8.8	0.5%
26	TCB Beteiligungsgesellschaft mbH	Germany	8.6	0.5%
27	Oettinger	Germany	8.5	0.4%
28	Sapporo	Japan	8.4	0.4%
29	Swinkels Family Brewers	Netherlands	7.8	0.4%
30	Bitburger Braugruppe	Germany	6.6	0.3%
31	Krombacher	Germany	6.3	0.3%
32	Paulaner Brauerei Gruppe	Germany	6.0	0.3%
33	HiteJinro	South Korea	5.4	0.3%
34	Royal Unibrew	Denmark	5.2	0.3%
35	Hanoi Beverage Corp. (HABECO)	Vietnam	4.5	0.2%
36	Obolon	Ukraine	4.2	0.2%
37	Warsteiner	Germany	4.0	0.2%
38	Olvi Group	Finland	4.0	0.2%
39	Polar	Venezuela	3.9	0.2%
40	Gold Star	China	3.6	0.2%
TOTAL			1,709.8	89.8%
World beer production 2018			1,904.6	100.0%

The data were taken from the brewers' own annual reports.

In other cases, after different sources had reported differing figures, or where no figures were available, the production volume had to be estimated.

Only some of the major brewers were able to report growth in beer output in 2018. Among those who could were **Heineken** and **Grupo Petrópolis**, with growth of just under 16m hl and 5m hl respectively. **Efes** reported growth of around 11m hl, possibly due

to their acquisition of the **ABI** breweries in Russia and Ukraine. With world beer output declining by 1.9% in 2018, the top 40 brewing groups only slightly increased market share year on year to 89.8%.

TOP 40 BREWERIES

Mergers & acquisitions

Transaction activities were seen predominantly in the craft brewery segment. Here, for example, **Heineken** bought into **Beavertown**, London, and **Lion Brewery**, Australia, which belongs to **Kirin**, took control of **Fourpure** and **Magic Rock**, both also based in the UK. **Grupo Mahou-San Miguel** acquired a majority stake in

America's **Avery Brewing** based in Colorado and **Asahi** took over **Fullers**, the old-established British brewer. **Heineken** entered into a strategic participation in China, acquiring 40% of the shares in China's largest brewing group **China Resources Snow Breweries**.

BEER OUTPUT DEVELOPMENT

	2017 1,000 hl	2018 1,000 hl	2017 +/- % rel.	2018 +/- % rel.
European Union	394,886	401,059	-1.2%	1.6%
Rest of Europe	125,494	129,997	-2.9%	3.6%
Europe total	520,380	531,056	-1.6%	2.1%
North America	350,513	356,057	-0.1%	1.6%
Central America/Caribbean	23,144	23,281	1.1%	0.6%
South America	224,977	225,384	3.6%	0.2%
America total	598,634	604,722	1.3%	1.0%
Asia	664,060	607,334	-0.6%	-8.5%
Africa	138,613	140,937	2.5%	1.7%
Australia/Oceania	20,715	20,553	2.1%	-0.8%
WORLD TOTAL	1,942,402	1,904,602	-0.1%	-1.9%

In addition to corrections of the 2017 output figures for some countries as a result of information received after last year's report went to press, beer production volume has also been adjusted for Nigeria, Zambia and three Central American countries.

Compared with output volume in 2017, **world beer production in 2018 fell by 37.8m hl, or 1.9%** – a decline of unprecedented magnitude. This was due to a fall in output totalling 59m hl in China. Growth was reported by 85 of the 171 beer-brewing countries and only 34 reported a decline.

In **Europe** both the countries in the European Union and those in the rest of the continent saw output rise. The most significant growth here was seen in Russia (3.1m hl), Romania (1.5m hl) and the UK (1.1m hl).

The growth markets in **America** were Mexico (+9.7m hl) and Brazil (+1.4m hl). However, total output volume was brought down by the USA (-3.7m hl) and Venezuela (-2.9m hl).

In **Asia** growth was reported in the Philippines (+2.2m hl), India (+1.1m hl) and Japan (+1m hl). On the other hand, not only China (-59m hl) but also Thailand (-1.5m hl) and Iran (-1.3m hl) registered falling output.

The growth engine in **Africa** was Ethiopia (+2.6m hl), as it has been for the last few years.

The ranking of beer producing nations is led once again by **China**, the **USA**, **Brazil**, **Mexico** and **Germany**. These five countries account for half of world beer output volume.

HOP ALPHA ACID PRODUCTION

The working group "Arbeitsgruppe Hopfenanalyse" (AHA) reports the average alpha acid values measured in **freshly harvested hops**. These values constitute the basis for any adjustments of supply contracts containing "alpha clauses" between the brewing industry and the hop industry. The average values serve as the basis for parties concluding new supply

contracts containing an alpha clause.

The members of AHA are the in-house laboratories of the German hop-processing plants, HVG Mainburg, the Bavarian state institute of agriculture and hop research (Huell), BLQ Weihestephan, VLB Berlin, Labor Veritas (Zurich), TU Berlin and IHPS Žalec.

HOP ALPHA ACID PRODUCTION



Alpha acid values as is, as per EBC 7.4, in freshly harvested hops from crop years 2009 to 2018 and the 5-year and 10-year averages:

Area	Variety	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Ø 5 Years	Ø 10 Years
Hallertau	Hallertau Mfr.	4.2	3.8	5.0	4.6	3.3	4.0	2.7	4.3	3.5	3.6	3.6	3.9
	Hersbruck Spaet	3.4	3.5	4.5	3.0	1.9	2.1	2.3	2.8	2.3	2.0	2.3	2.8
	Saphir	4.5	4.5	5.3	4.4	2.6	3.9	2.5	4.0	3.0	3.3	3.3	3.8
	Opal	9.0	8.6	9.7	9.0	5.7	7.3	5.9	7.8	7.2	6.4	6.9	7.7
	Smaragd	6.4	7.4	8.0	6.0	4.3	4.7	5.5	6.2	4.5	3.0	4.8	5.6
	Perle	9.2	7.5	9.6	8.1	5.4	8.0	4.5	8.2	6.9	5.5	6.6	7.3
	Spalt Select	5.7	5.7	6.4	5.1	3.3	4.7	3.2	5.2	4.6	3.5	4.2	4.7
	Hallertau Tradition	6.8	6.5	7.1	6.7	5.0	5.8	4.7	6.4	5.7	5.0	5.5	6.0
	Mandarina Bavaria				8.8	7.4	7.3	7.0	8.7	7.3	7.5	7.6	
	Hallertau Blanc				9.6	7.8	9.0	7.8	9.7	9.0	8.8	8.9	
	Huell Melon				7.3	5.3	5.4	5.8	6.8	6.2	5.8	6.0	
	Northern Brewer	10.4	9.7	10.9	9.9	6.6	9.7	5.4	10.5	7.8	7.4	8.2	8.8
	Polaris				20.0	18.6	19.5	17.7	21.3	19.6	18.4	19.3	
	Hallertau Magnum	14.6	13.3	14.9	14.3	12.6	13.0	12.6	14.3	12.6	11.6	12.8	13.4
	Nugget	12.8	11.5	13.0	12.2	9.3	9.9	9.2	12.9	10.8	10.1	10.6	11.2
Hallertau Taurus	17.1	16.3	17.4	17.0	15.9	17.4	12.9	17.6	15.9	13.6	15.5	16.1	
Herkules	17.3	16.1	17.2	17.1	16.5	17.5	15.1	17.3	15.5	14.6	16.0	16.4	
Elbe-Saale	Hallertau Magnum	13.7	13.1	13.7	14.1	12.6	11.6	10.4	13.7	12.6	9.3	11.5	12.5
Tettnang	Tettnang	4.2	4.0	5.1	4.3	2.6	4.1	2.1	3.8	3.6	3.0	3.3	3.7
	Hallertau Mfr.	4.5	4.2	5.1	4.7	3.3	4.6	2.9	4.4	4.3	3.8	4.0	4.2
Spalt	Spalt	4.4	3.7	4.8	4.1	2.8	3.4	2.2	4.3	3.2	3.5	3.3	3.6
	Spalt Select	5.7	5.6	6.4	4.6	3.3	4.5	2.5	5.5	5.2	2.9	4.1	4.6
Slovenia	Aurora	7.8	8.3	9.1	8.0	6.1	10.2	8.5	8.7	7.3	8.9	8.7	8.3
	Savinjski Golding	4.0	2.7	3.8	2.6	2.1	3.9	2.0	3.4	2.2	3.3	3.0	3.0
	Bobek	5.0	4.8	6.0	4.0	2.1	6.4	5.0	4.4	3.5	4.3	4.7	4.6
	Celeia	4.2	4.0	4.1	3.2	2.2	4.7	3.2	3.2	2.8	3.0	3.4	3.5
Czech Rep.	Saaz	3.9	3.2	4.0	3.8	2.9	2.9	2.1	3.4	3.0	2.9	2.9	3.2
	Sládek	7.5	7.2	7.9	7.0	7.0	6.6	5.0	6.5	6.2	4.3	5.7	6.5
	Premiant	10.0	9.3	9.8	8.5	8.0	7.6	7.0	8.5	7.6	5.1	7.2	8.1
Poland	Lubliner	4.6	2.6	3.8	4.7	4.3	2.3	3.4	3.2	3.2	2.1	2.8	3.4
	Marynka	8.7	8.2	8.7	7.3	8.3	8.2	8.6	8.1	8.7	6.9	8.1	8.2
	Sybilla					5.9	5.9	4.5	6.1	5.4	4.1	5.2	

All other alpha acid values mentioned in the Barth Report were recorded on the basis of % as is, EBC 7.4 ToP (Time of Processing).

The alpha acid production of the world hop crop, divided into the groups below, was as follows:

Group	2017					2018				
	Crop share	Crop mt	Alpha Ø	Alpha mt	Alpha share	Crop share	Crop mt	Alpha Ø	Alpha mt	Alpha share
Aroma	61.3%	72,651	7.3%	5,305	47.1%	59.3%	70,236	6.9%	4,842	44.3%
Bitter	38.7%	45,885	13.0%	5,956	52.9%	40.7%	48,174	12.6%	6,083	55.7%
TOTAL	100.0%	118,536	9.5%	11,261	100.0%	100.0%	118,410	9.2%	10,925	100.0%

Aroma hops
USA 62.7%
(previous year 62.3%),
Germany 19.2%
(previous year 20.8%)

Bitter hops
Germany 47.6%
(previous year 49.4%),
USA 36.9%
(previous year 33.5%)

The crop volume of slightly more than 118,400 mt in 2018 was almost the same as in the previous year. However, acreage increased by 1,500 ha year on year, which meant that average yield declined from 2.01 mt/ha to 1.96 mt/ha. Average alpha content also fell from

9.5% to 9.2% in crop year 2018, reducing total alpha production by 336 mt. This result was principally due to the lower yields in terms of crop and alpha volume induced by climate effects.

HOP ALPHA ACID PRODUCTION

Comparing the results of crop years 2017 and 2018, the proportion of aroma hops in crop yield and alpha production fell by 2% and 2.8% respectively, while that of bitter hops rose accordingly.

The countries with the largest share of world alpha production in 2018 were the USA, with 48%, and

Germany, with 35%. The two biggest hop-growing nations' combined share was 83%, as in 2017.

The alpha acid values upon which the calculations are based are recorded using the method of EBC analysis 7.4 – % as is at the time of processing (ToP).

ALPHA ACID BALANCE

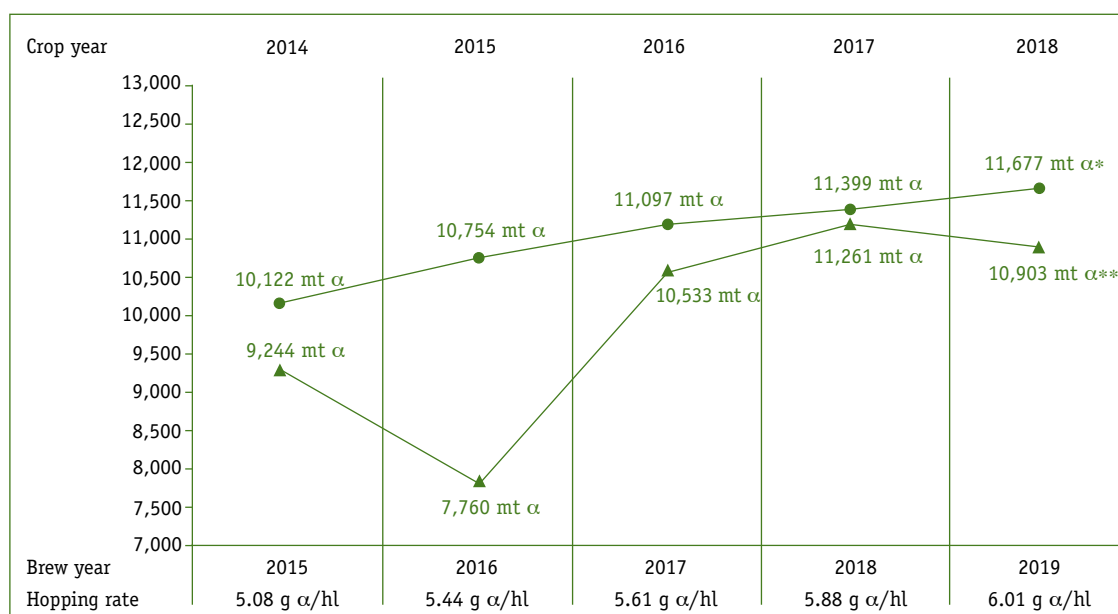
Supply situation

Brewing year	
2015	- 878 mt α
2016	- 2,994 mt α
2017	- 564 mt α
2018	- 138 mt α
2019	- 774 mt α

- Alpha demand (brewing year)
- ▲ Alpha production (crop year)

* Estimate

** Taking into account the shortfall caused by warehouse fire in Australia



Following thorough examination of hop utilisation in modern breweries, we revised the parameters upon which our calculation of alpha demand is based, which retrospectively led to a somewhat lower alpha demand figure. Nevertheless, the alpha acid balance is negative for the seventh year in succession. Despite the decline in beer output, the alpha volume required by the beer

industry as a whole has grown along with the craft beer segment.

The demand for hops beyond brewing has been taken into consideration in our calculation of the alpha supply situation.

CROP PROTECTION – MAXIMUM RESIDUE LEVELS

The European Union's plant protection policy is increasingly developing into an enormous challenge for the global hop industry. The internationally recognised, scientifically based risk assessment of active substances in plant protection products also practised in the EU until recently is now being replaced with abstract, hazard-based "cut-off" criteria. As a result, the European hop growers find themselves having to meet an increasing diversity of customer requirements with a constantly shrinking range of

available plant protection agents. This means not only that the system of integrated plant protection and the resistance management required for it is being called into question, but also that the security of supply of quality hops to the international brewing industry may be at risk. In the long term, this will also apply to non-European growers who will be limited in their choice of available plant protection agents for use on hops they export to Europe as a result of the removal of import tolerances.

CROP PROTECTION – MAXIMUM RESIDUE LEVELS

The hop industry has made a significant step towards the harmonisation of international maximum residue level regulations. Last year the German hop industry association, the German hop growers' association and the USHIPPC (United States Hop Industry Plant Protection Committee) jointly entered into an agreement

with the American consulting agency Bryant Christie, Inc. The team at Bryant Christie is made up of people who are proven experts at ensuring that international agricultural marketing is as fair and unrestricted as possible.

MARKET ANALYSIS

In crop year 2018, a volume of 118,410 tonnes was harvested worldwide on a planted area of 60,383 hectares, the largest acreage figure since 1997. Both the yields and the alpha acid values were slightly below average. Although planted area grew by 1,494 ha, the alpha volume harvested worldwide was down 3%, or 10,925 mt, year on year. At the same time, demand for hops is rising because lightly hopped mainstream beers are losing market share to heavily hopped ones. The estimated alpha demand for the 2019 brewing year is the highest ever recorded. This is all the more surprising in view of the downward trend in world beer production since the 2014 brewing year. During this period, output fell by 67 million hectolitres.

An increasing source of confusion both within and outside the hop industry in recent years has been the difference between the assessments of the alpha acid balance by two major market participants. While the Barth-Haas Group assumes that the ongoing supply deficit is now in its seventh year, others regard the market as now being balanced. It is rather unlikely that both of these opinions can be correct. The different views of the supply situation stem from the calculation of the hopping rate – above all in the craft beer market segment. The fact that spot hop prices remain high both for aroma and for bitter varieties supports our view that the world hop market is more probably undersupplied.

In the USA and Germany, acreage increased again, if only moderately. With a joint market share of 72%, these two countries dominate the world market to a greater extent than ever. Even more so, their combined share of world hop and alpha volume speaks for itself.

Already the world's biggest hop-growing nation in terms of planted area since 2015, the USA continues to consolidate its dominance year by year. No other country has anything like as many different hop varieties under cultivation. In addition, of the astonishing total of 87 varieties, 36 come from companies' proprietary breeding programmes and seven of the "Big Eight" aroma/flavour varieties are of US origin. This group consists of the varieties that are to be found in virtually every recipe as indispensable guarantors of flavour intensity in cold-hopped beers. These hop varieties/brands are: Citra®, Cascade, Centennial, Simcoe®, Amarillo®, Chinook and

Mosaic®. The last variety to make it into the Big Eight is Australia's Galaxy™. The undisputed number one in the rankings is Citra®. The 2018 harvest saw Citra® displace Cascade as the leading variety, and since then its acreage has been the largest in the USA.

Nevertheless, not all that glitters in the USA is gold. In the case of some aroma varieties, such as Centennial and Chinook, there is still a surplus. Among the bitter hops, however, there is a supply shortage. In global terms, there is no lack of bitter hop acreage which has been continuously increasing again, both in the USA since 2017 and in Germany for years now. However, the market has been suffering from low crop and alpha volume, as was particularly the case for the 2018 crop due to climatic conditions in Germany. If the crop develops normally in 2019, the harvest should provide the brewing industry with sufficient quantities of bitter hops.

There is still a supply surplus of some aroma varieties, but due to the continuing further development of craft beer styles (e.g. Hazy IPA), supply of other aroma varieties in the USA (proprietary varieties grown under licence) is balanced to short. There continues to be a surplus of German aroma/flavour hops. The traditional German aroma varieties Perle and Hallertau Tradition are in short supply following the below-average German harvest in 2018. The market situation for fine aroma varieties can be described as stable.

A very high proportion of the world market in hops awaiting harvest this year has been forward-contracted. Nevertheless, it has been noticeable in recent years that due to the constant expansion of acreage, in many variety segments supply has been approaching saturation point. This was not reflected by the spot market in 2018, however, due mainly to the below-average harvest in Germany.

The price levels for non-contracted hops harvested in 2018 were high in virtually all variety segments. This in turn affected the contract market. In recent years, contracts signed in both the USA and Germany have featured good conditions and long durations. The resulting stability forms an indispensable foundation for the investments in infrastructure and quality that have to be made in the first place in connection with the necessary expansion of acreage.

HOP FORWARD CONTRACT RATES

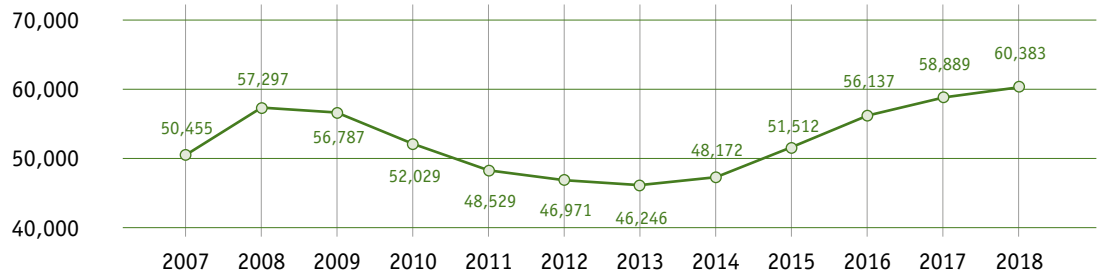
Forward contract rates (as per spring 2019)

Due to insufficient availability of official data, the forward contracting rates are based on estimates and have been calculated on the long-term average yield.

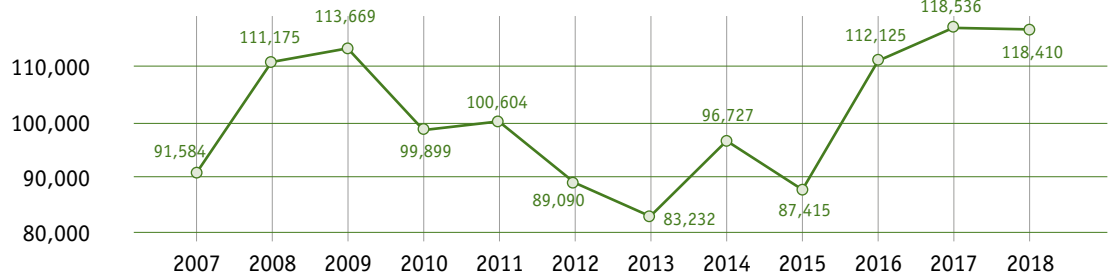
COUNTRY	2019	2020	2021	2022
Germany	95%	95%	85%	80%
Czech Republic	98%	98%	90%	80%
Slovenia	90%	85%	80%	75%
Poland	85%	80%	60%	30%
England	80%	80%	40%	20%
France	85%	80%	75%	75%
USA	98%	90%	70%	50%
Australia	90%	90%	80%	80%

DEVELOPMENT 2007 - 2018

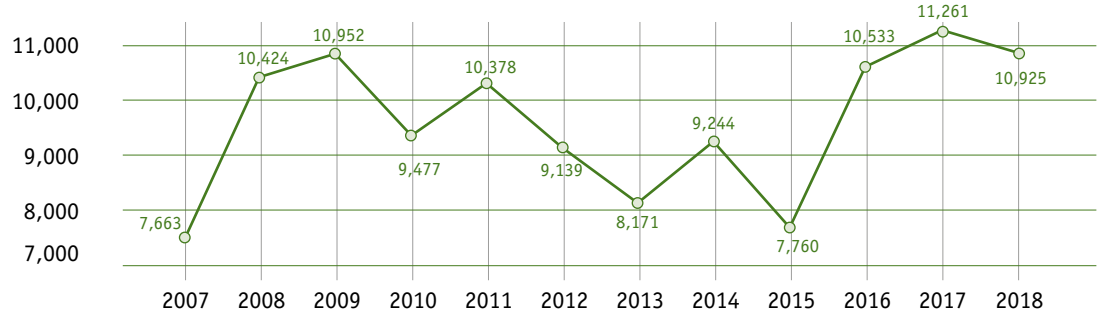
HOP AREA UNDER CULTIVATION IN HA



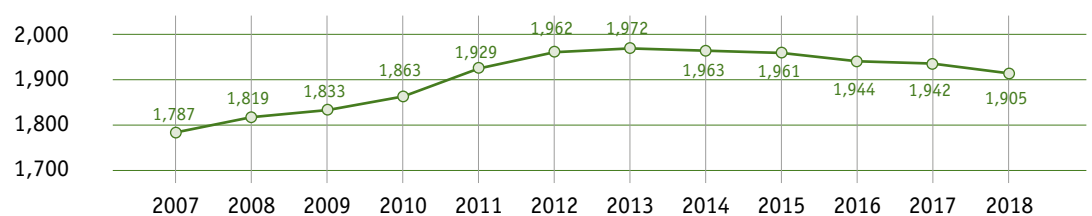
HOP PRODUCTION IN MT



HOP ALPHA PRODUCTION IN MT



BEER PRODUCTION IN MILLION HL



WORLD HOP ACREAGE AND CROP



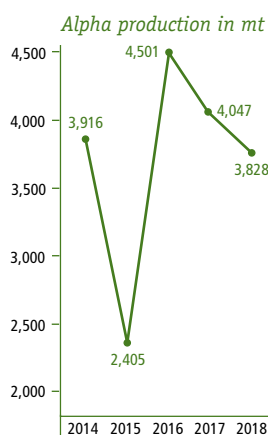
		2017				2018			
		Acreage ha	Production mt	Ø-Alpha %	Alpha mt	Acreage ha	Production mt	Ø-Alpha %	Alpha mt
Germany	Hallertau	16,310	35,540.2	9.9%	3,518	16,780	36,554.8	9.5%	3,457
	Elbe-Saale	1,466	2,938.8	10.7%	315	1,541	2,488.5	8.2%	203
	Tett nang	1,353	2,270.4	7.1%	160	1,397	2,075.1	6.3%	130
	Spalt	391	762.2	6.6%	50	404	631.3	5.5%	35
	Other	22	44.7	8.8%	4	22	44.6	8.0%	4
Total		19,543	41,556.3	9.7%	4,047	20,144	41,794.3	9.2%	3,828
Czech Republic	Saaz	3,815	5,116.4	3.8%	195	3,856	3,989.5	3.3%	130
	Tirschtz	600	864.2	2.7%	23	629	586.2	2.9%	17
	Auscha	530	816.2	3.8%	31	535	550.7	3.1%	17
Total		4,945	6,796.8	3.7%	249	5,020	5,126.4	3.2%	164
Slovenia		1,591	2,766.5	4.9%	134	1,667	3,078.0	5.4%	165
Poland		1,576	2,993.2	7.9%	236	1,662	3,208.4	7.3%	234
England		967	1,780.6	7.1%	126	965	1,378.0	6.7%	93
Spain (incl. Galicia)		521	613.0	11.2%	69	543	886.7	12.1%	108
France		481	763.7	3.9%	30	498	864.0	3.1%	27
Romania		270	205.0	9.4%	19	277	215.0	9.0%	19
Austria		250	442.0	8.0%	35	256	446.9	7.0%	31
Belgium		155	237.1	9.0%	21	182	281.8	6.4%	18
Slovakia		138	118.0	3.3%	4	138	122.0	3.2%	4
Bulgaria*		22	64.0	9.1%	6	37	53.5	8.5%	5
Portugal		12	16.4	9.5%	2	12	17.5	10.5%	2
Netherlands		4	2.0	11.8%	0	4	1.0	12.3%	0
European Union		30,475	58,354.6	8.5%	4,978	31,405	57,473.4	8.2%	4,698
Ukraine*		370	420.0	5.8%	24	370	400.0	5.5%	22
Russia		344	522.0	4.3%	22	240	371.7	4.7%	17
Turkey		283	187.7	9.9%	19	223	164.5	9.6%	16
Belarus/White Russia		55	60.0	9.0%	5	58	50.0	9.0%	5
Switzerland		16	17.7	8.2%	1	18	25.2	6.2%	2
Rest of Europe		1,068	1,207.4	5.9%	71	909	1,011.4	6.1%	62
EUROPE		31,543	59,562.0	8.5%	5,049	32,314	58,484.8	8.1%	4,760
USA	Washington	15,556	35,694.9	11.4%	4,075	15,852	35,257.1	11.2%	3,951
	Idaho	2,830	6,241.3	10.7%	669	3,294	7,367.8	10.3%	761
	Oregon	3,177	5,403.8	9.1%	492	3,126	5,867.8	8.8%	517
	PNW-States	21,564	47,340.0	11.1%	5,236	22,272	48,492.7	10.8%	5,229
	Other States	1,012	850.5	7.5%	64	983	680.4	7.0%	48
Total		22,576	48,190.5	11.0%	5,300	23,255	49,173.1	10.7%	5,277
Canada*		320	290.0	9.6%	28	330	230.0	9.0%	21
Argentina		153	266.7	8.4%	22	160	269.6	9.2%	25
AMERICA		23,049	48,747.2	11.0%	5,350	23,745	49,672.7	10.7%	5,323
China	Xinjiang	1,648	4,506.0	6.5%	293	1,480	4,210.0	6.4%	271
	Gansu	1,035	2,538.0	6.8%	172	1,128	2,782.0	6.6%	183
	Total	2,683	7,044.0	6.6%	465	2,608	6,992.0	6.5%	454
Japan		120	273.4	6.5%	18	106	202.2	4.9%	10
ASIA		2,803	7,317.4	6.6%	483	2,714	7,194.2	6.4%	464
South Africa		421	710.6	12.9%	92	427	754.1	11.9%	90
AFRICA		421	710.6	12.9%	92	427	754.1	11.9%	90
Australia		631	1,438.3	14.6%	211	652	1,582.3	14.3%	225
New Zealand		442	760.5	10.0%	76	531	722.0	8.8%	63
AUSTRALIA/OCEANIA		1,073	2,198.8	13.1%	287	1,183	2,304.3	12.5%	288
WORLD		58,889	118,536.0	9.5%	11,261	60,383	118,410.1	9.2%	10,925

* estimate

Italics: corrections of figures for 2017 as stated in last year's report

Rounding differences of the acreage may cause differences in addition

GERMANY



Area	Variety	Development of acreage			Development of production				
		Acreage ha			Ø Yield mt/ha		Production mt		
		2017	+/-	2018	2017	2018	2017	2018	
Hallertau	Perle	2,653	28	2,681	1.95	1.85	5,184.18	4,954.78	
	Hallertau Tradition	2,592	-12	2,580	1.93	1.99	5,009.90	5,132.01	
	Hersbruck Spaet	910	8	918	1.98	2.09	1,806.16	1,914.57	
	Hallertau Mittelfrueh	539	-36	503	1.35	0.91	730.31	456.18	
	Spalt Select	437	31	468	2.06	1.89	901.41	882.74	
	Saphir	416	19	435	1.92	1.91	798.27	829.55	
	Mandarina Bavaria	310	-29	281	2.60	2.61	806.12	732.32	
	Amarillo	250	8	258	0.39	2.18	98.26	561.79	
	Northern Brewer	162	-6	156	1.46	1.31	235.75	203.70	
	Hallertau Blanc	143	-1	142	2.36	2.56	337.69	363.01	
	Opal	138	1	139	1.88	1.79	259.55	248.71	
	Huell Melon	128	-17	111	2.29	1.92	292.68	213.20	
	Other Aroma	307	9	316	1.93	2.02	591.68	637.61	
	Total Aroma		8,986	3	8,989	1.90	1.91	17,051.96	17,130.17
	Herkules	5,406	491	5,897	2.63	2.76	14,243.57	16,282.50	
Hallertau Magnum	1,387	-23	1,364	2.30	1.54	3,186.57	2,100.22		
Hallertau Taurus	270	-26	244	2.03	2.04	547.97	497.99		
Polaris	95	36	131	1.44	1.72	137.27	224.73		
Nugget	119	-3	116	2.75	2.39	327.81	277.17		
Other	47	-8	39	0.96	1.08	45.04	42.00		
Total Bitter		7,324	467	7,791	2.52	2.49	18,488.23	19,424.61	
Total Hallertau		16,310	470	16,780	2.18	2.18	35,540.19	36,554.78	
Elbe-Saale	Perle	222	8	230	1.91	1.48	423.19	339.60	
	Saaz	129	20	149	1.22	1.08	157.62	161.47	
	Northern Brewer	138	-1	137	1.61	1.52	222.48	207.56	
	Other Aroma	117	41	158	1.72	1.35	201.09	212.63	
	Total Aroma	607	67	674	1.65	1.37	1,004.38	921.26	
	Hallertau Magnum	618	4	622	2.26	1.77	1,398.15	1,098.73	
	Herkules	141	-5	136	2.62	2.01	368.78	273.41	
	Other	100	10	110	1.67	1.77	167.46	195.09	
	Total Bitter	859	8	867	2.25	1.81	1,934.39	1,567.23	
Total Elbe-Saale	1,466	75	1,541	2.00	1.61	2,938.77	2,488.49		
Tettngang	Tettngang	747	3	750	1.31	1.20	976.89	899.63	
	Hallertau Mittelfrueh	147	1	148	1.53	1.21	224.25	178.97	
	Other Aroma	243	8	251	2.07	1.69	502.70	423.43	
	Total Aroma	1,137	12	1,149	1.50	1.31	1,703.84	1,502.03	
	Herkules	208	27	235	2.67	2.37	556.02	556.40	
	Other	9	4	13	1.18	1.28	10.58	16.64	
Total Bitter	217	31	248	2.61	2.31	566.60	573.04		
Total Tettngang	1,353	44	1,397	1.68	1.49	2,270.44	2,075.07		
Spalt	Spalt	121	-1	120	1.38	0.95	167.13	114.13	
	Other Aroma	225	14	239	2.14	1.72	482.59	410.53	
	Total Aroma	346	13	359	1.88	1.46	649.72	524.66	
	Bitter	45	-1	44	2.50	2.42	112.44	106.68	
Total Spalt	391	13	404	1.95	1.56	762.16	631.34		
Rhen.-P./Bitburg	Aroma	15	0	15	1.81	1.86	27.19	27.84	
	Bitter	8	0	8	2.19	2.09	17.50	16.75	
Total Rhen.-P./Bitburg	22	0	22	2.03	2.03	44.69	44.59		
Total Aroma		11,091	94	11,185	1.84	1.80	20,437.09	20,105.96	
Total Bitter		8,453	505	8,958	2.50	2.42	21,119.16	21,688.31	
GERMANY TOTAL		19,543	601	20,144	2.13	2.07	41,556.25	41,794.27	

Varieties with an acreage of less than 100 ha are included in 'Other aroma varieties' or 'Other bitter varieties' in crop year 2018.

The addition of rounded acreage figures may lead to differences in totals in some cases.

Farm structure

The number of hop growers declined by a further 11 in crop year 2018, leaving a total of 1,121 hop farms with an average planted acreage of 18.0 ha (+0.7 ha) per farm. Within the Hallertau production region there were 903 growers (-9) with an average acreage of 18.6 ha (+0.7 ha) per farm.

376 growers have given up hop farming in Germany in the last ten years. During this period, on the other hand, the average planted acreage per farm has grown by 6.2 ha to 18.0 ha.

Acreage/variety development

Crop year 2018 saw planted hop acreage in Germany grow for the fifth year in succession. From 2017 to 2018 acreage grew by 601 ha (3.1%). The area planted

with aroma varieties rose by 95 ha to 11,185 ha, thus accounting for 55.5% of total hop acreage. Bitter variety acreage increased by 506 ha to 8,958 ha, bringing its proportion of total hop acreage to 44.5%. The variety showing the most significant change in acreage was **Herkules** with an acreage increase of 512 ha (8.8%).

The three principal varieties saw their share of acreage grow.

Herkules remained the number-one variety, with 31.3%. The number-two variety was **Perle**, with 14.9%, followed by **Hallertau Tradition**, with 13.5%. All in all, these three varieties accounted for 60% of Germany's total hop acreage.

In the last five years hop acreage developed as follows:

Variety	2014 ha	2015 ha	2016 ha	2017 ha	2018 ha	Percentage of acreage 2018
Perle	3,154	3,187	3,093	2,966	3,003	14.9%
Hallertau Tradition	2,825	2,914	2,827	2,704	2,712	13.5%
Hersbruck Spaet	924	955	940	916	924	4.6%
Tettnang	762	744	732	747	750	3.7%
Hallertau Mittelfrueh	838	751	733	723	687	3.4%
Spalt Select	523	534	534	532	578	2.9%
Saphir	381	423	450	473	515	2.6%
Mandarina Bavaria	99	207	346	356	321	1.6%
Northern Brewer	-	-	-	300	293	1.5%
Amarillo	-	-	-	280	300	1.5%
Hallertau Blanc	48	109	154	170	168	0.8%
Saaz	19	74	113	137	156	0.8%
Opal	63	130	140	141	141	0.7%
Huell Melon	56	101	134	157	140	0.7%
Spalt	112	114	119	121	120	0.6%
Other Aroma	71	96	220	369	378 ¹⁾	1.9%
Total Aroma	9,876	10,340	10,534	11,091	11,185	55.5%
Herkules	3,622	4,152	4,884	5,797	6,309	31.3%
Hallertau Magnum	2,642	2,353	2,196	2,011	1,992	9.9%
Hallertau Taurus	594	465	357	284	258	1.3%
Polaris	53	60	106	174	225	1.1%
Nugget	173	162	152	131	128	0.6%
Northern Brewer	267	238	266	-	-	-
Other	80	85	104	55	47 ²⁾	0.2%
Total Bitter	7,431	7,515	8,064	8,453	8,958	44.5%
GERMANY TOTAL	17,308	17,855	18,598	19,543	20,144	100.0%

1) Other aroma varieties include: Ariana, Brewers Gold, Callista, Cascade, Comet, Hallertau Gold, Hersbruck Pure, Monroe, Relax, Smaragd, Target
2) Others include: Hallertau Merkur, Record, others/selections

There may be differences in the sum totals due to figures being rounded up or down after the decimal point.

Crop volume

2018 began with plentiful precipitation and mild temperatures before the onset of winter in February brought frost with temperatures as low as -10 °C. This

period of cold weather led to good frost action in the upper soil layer, leaving the soil in good condition by the end of the winter.



**Alpha acid content overview for individual varieties, page 11*

In contrast to previous years, the temperatures in March 2018 were significantly lower and 1.5 °C below the long-term average. In fact, the ground was still covered with snow at times. In addition, due to repeated precipitation the soil was unable to dry out. Consequently, the hop gardens were mostly unsuitable for vehicles, which meant that spring work could not be started until towards the end of the month. Crown pruning was late in starting and in many of the hop gardens it was not until almost mid-April that the work could be completed. In April the weather conditions changed radically. From then on, warm and dry weather conditions accompanied by above-average sunshine duration predominated. Due to the warm temperatures, the hop plants grew rapidly and soon made up for the previous retardation in their development. Training began slightly earlier than usual and often had to be done under considerable time pressure, as the hop shoots continued to grow at a very fast pace. The warm temperatures, accompanied at times by plentiful rainfall, continued in May, providing ideal growing conditions. The hop plants developed remarkably quickly, with the first already reaching trellis height at the beginning of June, some two to three weeks earlier than the long-term average. With plant development far ahead of normal, the early-maturing varieties **Hallertau Mittelfrueh** and **Northern Brewer**, as well as numerous stands of **Hallertau Magnum**, began flowering as early as mid-June. This early flowering resulted in significantly lower-than-average yields. In July and August the weather conditions in the Hallertau region were characterised by hot summery temperatures. At the same time, with the exception of scattered, highly localised thundery showers, there was very little precipitation during the cone development phase. These dry, hot weather conditions also accelerated hop ripening, with the result that harvesting began approximately one week earlier than in previous years. Yields reflected the unfavourable growing conditions, with lower-than-average volume being harvested in all the German hop-growing regions, in most cases with disappointing alpha content. While the visual quality of the early varieties was still good when picking began, the quality of the late-maturing varieties with later harvesting times was increasingly impaired by late powdery mildew infection and spider mite infestation. This phenomenon was particularly noticeable in **Hersbruck Spaet** and **Herkules** hops.

The harvested volume of 41,800 for crop 2018 was 4% higher than the figure estimated when picking began. Although the average yield per hectare was down year on year, the total volume was slightly higher as a result of planted acreage having increased.

**Forward contract rates up to crop year 2022, page 14*

Alpha content*

Alpha acid content in crop 2018 was almost universally disappointing. Apart from some few exceptions, content was not only down year on year, but in some cases even fell significantly below the average values of the last five and ten crop years. The effect can be seen in a comparison of alpha yields. In spite of total German crop volume being virtually identical, the alpha yield of 3,828 mt in 2018 was down 5.4% year on year.

Market situation

Spot market crop 2018

Growers received no fixed-price offers for non-contracted hops. It was not until the third week of September that marketers announced advance payment prices to promote their pools and purchasing initiatives. The payments offered, for example, were 8.50 EUR/kg for the principal varieties **Perle** and **Hallertau Tradition**, 9.00 EUR/kg for **Hersbruck Spaet**, 40.00 EUR/kg alpha for **Herkules** and **Hallertau Taurus** and 50.00 EUR/kg alpha for **Hallertau Magnum**. Towards the end of the month there was a sharp rise in prices – particularly for high alpha varieties. Prices rose to 55.00 EUR/kg alpha for **Herkules** and **Hallertau Taurus** and 60.00 EUR/kg alpha for **Hallertau Magnum**. With only very limited quantities of non-contracted hops available anyway due to the high volume of forward contracts, the entire volume was marketed through the pools and purchasing initiatives within only a few weeks.

Contract market

According to the EU crop report, growers had forward contracted approx. 92% of the total German crop produced in 2018 at an average price of 5.37 EUR/kg. In October 2018, growers in the Hallertau region received offers of forward contracts from marketers, but these were limited to only a few varieties. In November, prices were in some cases adjusted according to duration. Where durations were longer (in some cases up to 2029), prices from crop year 2023 onwards were lower, while in the case of contracts running until 2025 there was no price reduction for the last crop years. All activity came to a halt in December. No further purchase offers were made until spring – and then with only sporadic bidding by individual companies for selected varieties, however. In general, due to high forward contract obligations, growers will have very limited quantities of non-contracted hops in the next few years in particular.

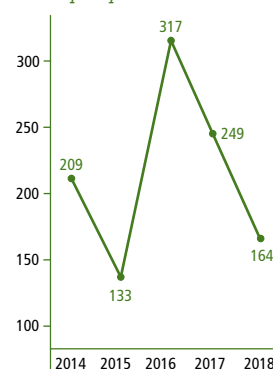
95% of crop 2019 has been forward contracted*.

CZECH REPUBLIC



Variety	Development of acreage Acreage ha			Development of production Ø Yield mt/ha Production mt			
	2017	+/-	2018	2017	2018	2017	2018
Saaz	4,317	32	4,349	1.28	0.94	5,514.2	4,090.0
Sládek	295	25	320	2.08	1.56	613.9	497.7
Premiant	165	5	170	2.07	1.42	342.3	240.9
Other Aroma	114	10	124	1.86	1.56	212.0	193.5
Total Aroma	4,891	72	4,963	1.37	1.01	6,682.4	5,022.1
Agnus	42	0	42	2.33	2.16	97.7	90.6
Other Bitter	12	3	15	1.39	0.91	16.7	13.7
Total Bitter	54	3	57	2.12	1.83	114.4	104.3
CZECH REPUBLIC TOTAL	4,945	75	5,020	1.37	1.02	6,796.8	5,126.4

Alpha production in mt



Farm structure

In crop year 2018 the number of hop growers increased once again. There are now 122 producers – an increase of five year on year. Despite the consequent rise in total acreage, the average cultivated area per farm fell from 42 ha in crop year 2017 to 41 ha.

Acreage/crop volume/alpha content

Hop acreage in the Czech Republic grew by 1.5%, with all three growing regions seeing an increase in acreage. The variety that saw the most significant expansion was **Saaz**, followed by **Sládek**.

In spite of an unusual cold spell from early March to mid-April, the spring work was completed within the usual period. The weather that followed was very warm, for the most part with tropical temperatures, which stimulated rapid growth among the hop plants. This growth was further encouraged by localised rainfall. By mid-June, plant development was more than two weeks ahead of the multi-year average. This was largely cancelled out due to rainy conditions and cooler temperatures in the second half of June. From mid-July to the beginning of harvesting on or around 15 August, conditions were extremely dry, with excessively high temperatures. Due to the general water shortage, local water authorities issued a ban on water withdrawal from rivers and wells for hop irrigation for the period from mid-July to the beginning of August. This had an additionally adverse effect on all varieties, with regard both to yield, which was more than 25% below the five-year average, and to alpha content. Furthermore, the weather conditions led to late, but massive, infestation by red mites, which could not be brought under control in some places.

While the alpha content in **Saaz** hops was only slightly below the average for the last five crop years, the results for the **Sládek** and **Premiant** varieties were significantly below this average. The lower production volume and the lower alpha acid values led to a year-on-year decline in alpha yield amounting to 34%.

Market situation

On the basis of average yields per hectare, the 2018 crop counted as almost completely sold out. Depending on when contracts had been signed, the prices for the main varieties ranged from between 175.00 and 290.00 CZK/kg (6.75 and 11.20 EUR/kg) for **Saaz** hops to between 115.00 and 175.00 CZK/kg (4.45 and 6.75 EUR/kg) for **Sládek** and **Premiant**. However, the below-average crop yields in 2018 led in some cases to considerable underdeliveries of contracted quantities by hop growers. Due to lack of supply, there was no spot market. In spite of the delivery shortfalls, warehouses were well stocked thanks to the good harvests in recent years and brewery customers did not experience a shortfall in supply. In some cases, hop growers expressed interest in contract extensions, but there were no offers on the part of buyers.

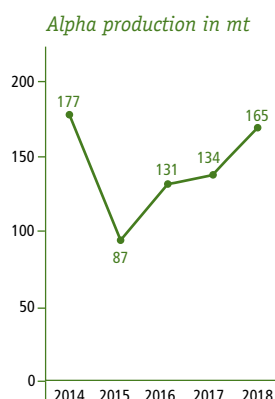
In crop year 2019, the area planted with **Saaz** hops will be 85 ha smaller, although hop acreage in the Czech Republic will only decrease by 16 ha in total. The 2019 crop can be considered to be sold out, as forward contracts account for at least 95% of crop volume.

Growers' plans to invest in new production equipment in order to reduce production costs and align the quality of the hops harvested with the high standards demanded by their customers in the brewing industry could not be implemented due to lower revenues and even losses in crop year 2018. In many cases, they had to be postponed by a year.

Alpha acid table, page 11

Forward contract rates up to crop year 2022, page 14

SLOVENIA



Variety	Development of acreage Acreage ha			Development of production Ø Yield mt/ha Production mt			
	2017	+/-	2018	2017	2018	2017	2018
Celeia	595	-11	584	1.94	2.09	1,153.4	1,220.8
Aurora	482	69	551	1.87	1.92	903.2	1,058.0
Savinjski Golding	178	8	186	1.13	0.99	201.6	184.2
Bobek	164	5	169	1.63	2.02	267.5	340.7
Styrian Gold	50	-1	49	1.55	1.31	77.3	64.2
Other Aroma	101	6	107	1.26	1.68	126.8	179.4
Total Aroma	1,570	77	1,647	1.74	1.85	2,729.8	3,047.3
Total Bitter	21	-1	20	1.75	1.52	36.7	30.7
SLOVENIA TOTAL	1,591	76	1,667	1.74	1.85	2,766.5	3,078.0

Farm structure

There were 121 active hop growers in crop year 2018. As in 2017, the number of growers grew by five. Due to the simultaneous increase in total acreage, the average area planted with hops remained constant at 14 ha per farm.

Acreage/crop volume/alpha content

There was an increase in acreage for the sixth year in succession. Following a rise of 5% in crop year 2018, acreage has returned to the same level as in crop year 2003. During this period, despite an increase of 14% from 2017 to 2018, the area planted with **Aurora** hops has almost halved (2003: 1,060 ha / 2018: 551 ha).

In February and for much of March, the weather was very cold. The snow cover remained into the first half of March. Precipitation during the winter months was some 50% higher than the long-term average. Nevertheless, the growers managed to complete all the spring work, in particular the crown pruning, within the recommended period. Very warm April weather encouraged rapid plant growth, as a result of which training began about one week earlier than usual. The summer months were not excessively hot, particularly in the main Slovenian hop-growing region in the Savinja Valley, and there was sufficient rainfall at regular intervals. The hop plants thus developed in ideal conditions throughout the vegetation period. Only the **Savinjski Golding** hops were slightly below average in terms of plant development, having flowered early as a result of very rapid growth in the spring. Apart from quality impairment in **Celeia** hops – the last to be harvested – due to downy mildew, hop quality in general was high. The yields per hectare exceeded the already high levels of the previous year in nearly all varieties. The last similarly high crop yield in Slovenia was in 1997.

Alpha acid levels in 2018 were unevenly distributed. While alpha content was above the multi-year average in the **Aurora** and **Savinjski Golding** varieties, it fell short of it in **Bobek** and **Celeia** hops. The alpha yield was up 23% year on year.

Market situation

At the time of harvest, some 85% of crop volume had already been sold. The market for spot hops was influenced in particular by the low yields and low alpha acid content of Perle hops in Germany. Growers already began receiving offers from marketers while the harvest was still in progress. In view of the above-average yields of Slovenian hops, growers were very open to offers and the market sold out quickly.

Variety	Forward contract prices	Spot prices
SGC	4.20 - 7.50 EUR/kg	7.00 - 8.00 EUR/kg
SSA	4.50 - 7.00 EUR/kg	11.50 - 13.00 EUR/kg
SSG	7.00 - 10.00 EUR/kg	7.50 - 8.00 EUR/kg
SGB	5.00 - 6.50 EUR/kg	6.00 - 7.00 EUR/kg

Apart from individual contract extensions for **Celeia** and **Aurora** hops, no new contracts were signed.

Future acreage development will essentially be influenced by the increasing spread of the citrus viroid (CBCVd), which is causing great concern. This infection often remains undetected for a considerable time and is transmitted mechanically in the course of conventional intensive cultivation measures. Infestation can severely reduce crop yield and alpha acid content, thus causing significant economic losses. With the exception of **Styrian Wolf**, all Slovenian varieties are affected, with the most pronounced tendency among **Celeia** hops. The Slovenian Ministry of Agriculture and the hop institute IHPS are jointly working flat out to come up with a strategy to combat the viroid. Further spread of the viroid is to be prevented by means of an extensive catalogue of measures (mandatory reporting and clearance and temporary production halt).

Due to clearances in connection with the anti-viroid measures, total acreage will decline by about 70 ha in 2019 despite new plantings. It is expected on the one hand that **Celeia** acreage will be cut back, while on the other hand **Aurora** and **Wolf** acreage will increase. In spring 2019, approximately 85% of the coming crop had already been sold*.

Variety abbreviations:

SGC – Celeia

SSA – Aurora

SSG – Savinjski Golding

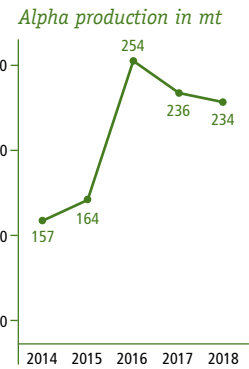
SGB – Bobek

Alpha acid table, page 11

*Forward contract rates up to crop year 2022, page 14



Variety	Development of acreage Acreage ha			Development of production Ø Yield mt/ha Production mt			
	2017	+/-	2018	2017	2018	2017	2018
Lubelski	419	-15	404	1.52	1.58	639.3	638.7
Marynka	273	37	310	2.00	1.77	544.9	549.0
Sybilla	98	12	110	1.91	1.75	188.5	192.1
Hallertau Tradition	70	-9	61	1.89	2.33	132.8	141.9
Perle	49	-5	44	2.05	2.38	100.0	104.9
Other Aroma	24	7	31	1.41	1.67	33.3	51.8
Total Aroma	934	26	960	1.76	1.75	1,638.8	1,678.4
Hallertau Magnum	520	37	557	2.15	2.11	1,117.5	1,174.6
Magnat	102	24	126	1.99	2.58	203.7	325.5
Other Bitter	20	-1	19	1.66	1.57	33.3	29.9
Total Bitter	642	59	702	2.11	2.18	1,354.4	1,530.0
POLAND TOTAL	1,576	86	1,662	1.90	1.93	2,993.2	3,208.4



The addition of rounded acreage figures may lead to differences in totals in some cases.

Farm structure

The number of hop growers in Poland has been rising again since 2014. In 2018, there were 666 hop producers (2017: 652), the same number as in 2012. Throughout this period, the average planted area per farm has remained unchanged at approx. 2 ha.

Acreage/crop volume/alpha content

The total planted acreage increased by 5%. Among the aroma hops, the varieties singled out for acreage expansion were **Marynka** (+14%) and **Sybilla** (+12%). On the other hand, acreage cutbacks affected **Hallertau Tradition** (-13%), **Perle** (-10%) and **Lubelski** (-4%). Among the bitter varieties, **Magnat** saw the greatest acreage expansion of all, with an increase of 24%. Another bitter variety to see its acreage grow was **Hallertau Magnum**, with 7%. A mild winter with hardly any snow was followed seamlessly by a spring with summery temperatures. There was no rainfall in April and May, with temperatures reaching 30 °C. Some plants already reaching full trellis height by 10 June. It did not rain again until mid-June. Further rainfall in the second half of July was very unevenly distributed, but was extremely important for cone development. The high midsummer temperatures continued. The uneven distribution of the amount of rainfall was directly reflected in the plant development in the individual hop-growing regions which ranged from below average to well above average. The growers had to work hard to combat diseases and pests. Harvesting of **Lubelski** hops began as early as 20 August, which was two weeks earlier than usual. The late-maturing varieties benefitted from the rainfall on and around 25 August. The average yield per hectare equalled that of the previous crop year, which was approx. 8% above the average for the last five years.

Alpha content*, on the other hand, was significantly below the multi-year average.

The larger acreage and the consequently higher crop volume produced an alpha yield of a similar level as in 2017.

Market situation

At the time of harvest, the proportion of the crop for which forward contracts and delivery commitments were already in place was roughly 85 to 90%. In terms of volume, bitter varieties accounted for a slightly greater share than aroma varieties. The contract prices for **Lubelski** hops varied from 18 to 28 PLN/kg (4.15 to 6.45 EUR/kg). Prices ranged from 14 to 22 PLN/kg (3.20 to 5.00 EUR) for all other **aroma varieties** and were slightly higher, at between 15.50 and 24 PLN/kg (3.50 to 5.50 EUR), for all **bitter varieties**. Purchasing of spot hops did not begin until November, once most of the contracted hops had been accepted by their buyers. The marketers were primarily interested in the **bitter varieties**. Growers were often only able to sell uncontracted **Lubelski** hops as part of a package with other hops. Moreover, the price of approx. 17 PLN/kg (3.90 EUR/kg) for **Lubelski** spots was not only lower than for contracted quantities, but was also the lowest price paid for any variety on the spot market. Prices of 24 PLN/kg (5.50 EUR/kg) were offered for the other **aroma hops**. Growers generated their highest spot market revenues with **bitter hops** which sold for 25 PLN/kg (5.75 EUR/kg). The market was sold out by the end of the year. Only occasional interest was shown in forward contracts for **bitter varieties** towards the end of the season. Generally, there was no demand from any of the marketers for forward contracts. The area planted with **Lubelski** hops, which grew by 171 ha (70%) from 2012 to 2017, appears to have reached saturation point. This is due to lower demand from the domestic market on the one hand and the expansion of **Saaz** hop acreage in the Czech Republic and Germany on the other. **Saaz** hops are often given preference over the Polish **Lubelski** variety.

For crop year 2019 acreage is expected to increase by roughly 2%. At the same time, there are plans to clear acreage of **Lubelski** hops and replant it with hops of the **Hallertau Magnum** and **Magnat** varieties.

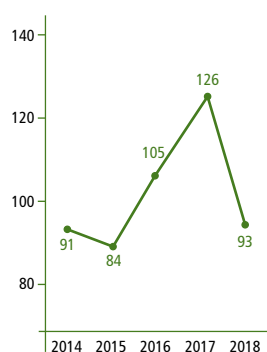
The forward contract rate for the coming harvest is estimated to be 85% on the basis of average yields.

*Alpha acid table, page 11

Forward contract rates up to crop year 2022 on page 14

ENGLAND

Alpha production in mt



Rounding differences of the production figures may cause differences in addition.

Variety	Development of acreage Acreage ha			Development of production Ø Yield mt/ha Production mt			
	2017	+/-	2018	2017	2018	2017	2018
Golding	141	1	142	1.98	1.23	279.5	175.2
EK Golding	98	0	98	2.48	1.71	244.2	167.3
Fuggle	94	-4	90	1.63	1.14	152.6	102.4
First Gold	98	-10	88	1.09	1.04	106.1	91.2
Progress	77	5	82	1.88	1.43	145.6	117.1
Pilgrim	71	3	74	2.21	2.26	157.4	167.2
Target	67	1	68	1.85	1.61	124.1	109.7
Challenger	59	3	62	2.32	1.69	137.7	104.8
Sovereign	54	-4	50	1.24	0.91	66.2	45.5
Other	208	3	211	1.76	1.41	367.2	297.6
ENGLAND TOTAL	967	-2	965	1.84	1.43	1,780.6	1,378.0

Farm structure

As in the previous year, there were 57 active hop growers in England. With acreage virtually unchanged year on year, the average hop-growing area in 2018 was once again 17 ha per farm.

Acreage/crop volume/alpha content

Changes in the varietal mix affected most of the varieties. The variety that saw the greatest contraction in acreage was **First Gold**, which declined by 10%. This variety has been declining in acreage since 2012 (-41%). **Progress**, on the other hand, has been planted more and more since 2014 (+52%), with a further increase of approx. 6% in 2018. In total, acreage remained virtually unchanged.

Cold weather conditions delayed the onset of the vegetation phase which was followed by a long dry period. This affected the yield which was significantly below the average of the last five years. The alpha-rich varieties were better able to cope with the growing conditions and remained more stable in yield.

The alpha acid levels in the early-harvest and low-alpha varieties were below the average of the last five years, while the late and alpha-rich varieties were above it. All in all, the alpha acid content of the 2018 crop had an average level of 6.7% (2017: 7.1%). There was thus a year-on-year decline in alpha yield of 26%.

Market situation

When picking began, roughly 80% of the 2018 crop volume had already been contracted. Depending on the variety and time of contracting, prices were between 7.00 and 10.00 GBP/kg (7.90 to 11.30 EUR/kg). The crop is considered to be sold out. Prices have remained stable. Acreage is expected to be expanded for crop year 2019.

Assuming an average yield, approximately 80% of the coming crop had already been sold by forward contracts* in the spring of 2019.

*Forward contract rates up to crop year 2022, page 14

FRANCE

Farm structure

The number of active hop farms in France increased by one in 2018, bringing the total up to 52. At the same time there was an increase in acreage. The average area planted with hops increased from 9 ha per farm in crop year 2017 to 10 ha per farm in 2018.

Acreage/crop volume/alpha content

The **Strisselspalt** variety saw a slight reduction in acreage in both regions. It remains by far the most important variety in French hop growing, however, with a share of 35% of total acreage. Among the other varieties, as in 2017, the variety that saw the greatest expansion in acreage in 2018 was again **Triskel**. While acreage in Northern France grew by one third, acreage expansion for the country as a whole amounted to 4%.

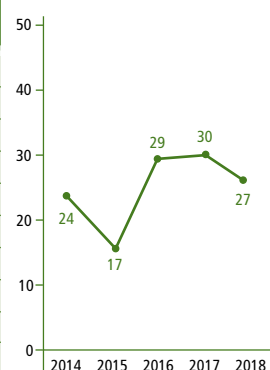
Continually windy conditions in May made additional training necessary, adding to the hop growers' workload. Two hailstorms, one in early May and the other at the end of the month, caused considerable damage. Precipitation was unevenly spread during the vegetation period. In some months there was a surplus of rain; in others there was a deficit. From late June onwards, hop plant development was a good two weeks ahead of normal. Flowering began early in all varieties. However, contrary to all expectations, the volume harvested was highly satisfactory. In fact, the yield per hectare was 10% higher than the average of the last five years.

FRANCE



Area	Variety	Development of acreage			Development of production			
		Acreage ha			Ø Yield mt/ha		Production mt	
		2017	+/-	2018	2017	2018	2017	2018
Elsass	Strisselspalt	179	-4	175	1.70	2.04	304.0	357.0
	Aramis	53	5	58	1.88	1.81	99.7	105.0
	Fuggle	49	5	54	1.19	1.08	58.1	58.1
	Triskel	39	9	48	0.82	1.41	32.0	67.8
	Savinjski Golding	45	-1	44	1.33	1.45	60.0	63.6
	Hallertau Tradition	28	-6	22	1.75	2.07	49.1	45.5
	Other Aroma	53	1	54	1.72	1.61	91.4	87.2
	Total Aroma	446	9	455	1.56	1.72	694.3	784.2
	Bitter	10	0	10	2.39	2.10	23.9	21.0
	Total Alsace	456	9	465	1.58	1.73	718.2	805.2
North	Aroma	18	5	23	2.03	1.97	36.6	45.3
	Bitter	7	3	10	1.27	1.35	8.9	13.5
	Total North	25	8	33	1.82	1.78	45.5	58.8
FRANCE TOTAL		481	17	498	1.59	1.73	763.7	864.0

Alpha production in mt



The alpha yield, however, was considerably below average. The average alpha acid content reported for the **Strisselspalt** variety was 1.4%, compared with 1.8% the year before. Together, the higher yield per hectare and the lower alpha acid content led to a year-on-year decline of 10% in alpha yield.

Market situation

As a result of the better-than-average harvest volume in crop year 2018, the proportion of hops already sold by forward contract fell from 90% to approx. 85%. Consequently, not all the spot hops found a buyer. In the spring of 2019, approx. 50 mt remained unsold.

With a further 10 ha planned, acreage expansion is set to continue in crop year 2019.

About 85% of the expected harvest volume had already been sold in the spring.

With the support of the domestic brewing industry, hops will also be planted outside the traditional hop-growing regions of Alsace and Flanders in the future. Around ten new producers spread across the entire country are trying their hand at hop growing. The extent of the acreage involved is not yet known, as it has not been officially registered yet.

Forward contract rates up to crop year 2022, page 14

USA



Farm structure

The number of hop growers in the Pacific Northwest (PNW) region declined by two for crop 2018 due to farm consolidations which reduced the total to 67 growers (larger growers with multiple corporate entities being counted as one grower). With the continued expansion of acreage in the PNW, the average farm size has increased from 312 to 332 ha (6%). Average farm sizes increased in Washington and Idaho to 453 ha (+21 ha) and 329 ha (+46 ha) respectively, while Oregon also rose slightly to 142 ha (+4 ha). The number of states outside the PNW growing hops commercially is thought to fall within the range of 25 to 30. A few of the larger growers reach sizes of around 100 to 150 ha, while most of the farms remain very small at below 10 ha.

The PNW acreage continues to expand into craft-popular aroma varieties, most of which ripen at around the mid-point of the harvest season. Despite significant investments to expand harvesting capacities

in recent years, the clustering of mid-season varieties is effectively shrinking the overall harvest window. As a result, harvesting facilities are again nearing capacity levels, which could lead to yet further need for additional investment by growers.

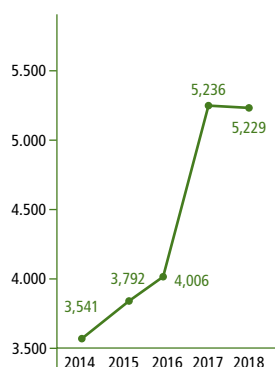
Acreage/variety development

Hop acreage in the PNW expanded by 708 ha (3.3%) for crop 2018, bringing the total to 22,272 ha for the traditional growing region. Despite a smaller increase relative to recent years, crop 2018 extends US acreage expansion to seven consecutive years and sets a fourth consecutive record for the largest acreage grown in the US. Washington grew 15,852 ha (68%), followed by Idaho at 3,294 ha (14%) and Oregon at 3,126 ha (13%), with the states outside of the PNW making up the remaining balance which is estimated at 983 ha (4%), putting the US total at 23,255 ha.

The summary below pertains to the traditional growing regions of Washington, Oregon, and Idaho which are also referred to as the Pacific Northwest (PNW) states. New developments outside the PNW states are reported in a separate section (page 27).

USA

Alpha production in mt



Area	Variety	Development of acreage			Development of production				
		Acreage ha			Ø Yield mt/ha		Production mt		
		2017	+/-	2018	2017	2018	2017	2018	
Washington	Citra®	1,475	483	1,958	1.96	1.81	2,890.0	3,534.6	
	Cascade	1,981	-251	1,730	2.38	2.21	4,717.0	3,823.0	
	Centennial	1,742	-173	1,568	1.91	1.53	3,325.5	2,397.5	
	Simcoe®	1,519	-263	1,256	2.01	1.84	3,050.6	2,311.1	
	Mosaic®	760	22	782	2.73	2.64	2,076.5	2,060.3	
	Amarillo®	803	-36	767	1.89	2.09	1,518.2	1,605.7	
	Chinook	660	42	702	2.00	2.10	1,320.6	1,474.7	
	Ekuanot™	360	-10	350	3.07	2.90	1,106.1	1,013.5	
	Cluster	251	-4	247	2.17	2.03	545.6	501.6	
	Azacca®	234	-13	221	2.76	2.79	645.7	616.9	
	Palisade®	231	-23	208	2.48	2.74	572.1	570.2	
	Willamette	231	-79	152	1.62	1.51	374.5	229.9	
	Other Aroma	1,602	16	1,618	1.94	2.17	3,112.1	3,512.8	
	Total Aroma		11,849	-291	11,558	2.13	2.05	25,254.7	23,651.8
	CTZ	1,567	305	1,872	3.25	2.87	5,092.9	5,369.6	
	Pahto™	396	300	696	2.02	2.34	799.3	1,629.2	
	Summit™	654	-17	637	2.32	2.05	1,516.1	1,303.7	
	Apollo™	277	45	322	3.06	3.19	846.7	1,027.0	
	Super Galena™	176	26	202	2.97	3.51	522.3	710.6	
Bravo™	197	-84	113	3.33	3.65	655.4	413.8		
Other Bitter	440	11	451	2.29	2.55	1,007.7	1,151.4		
Total Bitter		3,707	587	4,294	2.82	2.70	10,440.4	11,605.3	
Total Washington		15,556	296	15,852	2.29	2.22	35,694.9	35,257.2	
Idaho	Chinook	271	118	389	1.87	2.10	505.3	817.3	
	Citra®	307	39	346	1.86	1.61	570.5	557.7	
	Cascade	357	-19	338	1.99	1.92	708.5	650.7	
	Amarillo®	398	-64	334	1.76	2.25	699.6	751.8	
	Mosaic®	202	3	205	2.89	2.61	585.4	535.5	
	Other Aroma	656	131	787	2.04	1.94	1,339.0	1,522.9	
	Total Aroma	2,191	208	2,399	2.01	2.02	4,408.3	4,835.9	
	CTZ	409	196	605	3.09	3.10	1,263.8	1,875.6	
	Apollo™	92	2	94	2.02	2.19	185.9	205.3	
	Pahto™	3	16	19	0.40	1.79	1.2	34.8	
	Other Bitter	135	41	176	2.83	2.36	382.1	416.2	
	Total Bitter	639	256	895	2.87	2.83	1,833.0	2,531.9	
Total Idaho		2,830	464	3,294	2.21	2.24	6,241.3	7,367.8	
Oregon	Cascade	472	-41	431	1.60	1.82	754.3	783.3	
	Willamette	337	32	369	1.48	1.67	499.7	616.7	
	Centennial	299	-17	282	1.43	1.43	426.7	404.3	
	Citra®	290	-11	279	1.65	1.79	479.0	500.8	
	Simcoe®	187	-11	176	1.59	1.78	297.1	314.1	
	Crystal	155	-12	143	1.98	2.04	307.0	292.1	
	Mt. Hood	129	-3	126	1.61	1.63	207.6	204.6	
	Other Aroma	677	17	694	1.66	2.01	1,122.0	1,396.0	
	Total Aroma	2,546	-45	2,501	1.61	1.80	4,093.4	4,511.9	
	Nugget	553	-24	529	2.04	2.18	1,128.5	1,153.7	
	Other Bitter	78	19	97	2.33	2.08	181.9	202.2	
	Total Bitter	632	-6	626	2.07	2.17	1,310.4	1,355.9	
	Total Oregon		3,177	-51	3,126	1.70	1.88	5,403.8	5,867.8
Total Aroma		16,586	-128	16,458	2.04	2.01	33,756.3	32,999.6	
Total Bitter		4,978	837	5,815	2.73	2.66	13,583.7	15,493.1	
USA Pacific Northwest		21,564	709	22,272	2.20	2.18	47,340.0	48,492.7	
Other States		1,012	-29	983	0.84	0.69	850.5	680.4	
USA TOTAL		22,576	680	23,255	2.13	2.11	48,190.5	49,173.1	

Due to the conversion of acres into ha and from lbs into mt, there may be minor statistical deviations and differences in the sum totals caused by figures being rounded up or down.



In contrast to recent years, the 2018 acreage increase was driven mainly by an expansion of bitter variety acreage while aroma variety acreage remained relatively flat year on year. Bitter varieties increased by 837 ha (17%), the second consecutive increase following a seven-year decline, bringing the bitter varieties' share of total US acreage to 26%. Notable increases were registered for **CTZ** (+500 ha, 25%) and **Pahto™** (formerly HBC 682, +317 ha, 79%) with other varietal changes being relatively small.

Despite aroma variety acreage remaining flat overall, considerable rebalancing of individual varieties occurred. **Cascade**, the acreage leader over the past five years, shed acreage for a second straight year (-312 ha, 11%) and has been overtaken by **Citra®** (+511 ha, 25%) as the new acreage leader in the US. **Centennial** also trimmed acreage (-178 ha, 8%), dropping to fourth behind **CTZ**, while **Simcoe®** declined as well (-251 ha, 14%). **Chinook** was the only other aroma variety with a notable increase (+162 ha, 17%), while almost all the other changes were quite small.

Acreage for the main varieties in the PNW has developed as follows over the past five years:

Variety	2014 ha	2015 ha	2016 ha	2017 ha	2018 ha	Percentage of acreage 2018
Citra®	727	1,211	1,819	2,072	2,583	11.6%
Cascade	2,679	2,748	3,068	2,811	2,499	11.2%
Centennial	1,357	1,807	2,095	2,132	1,954	8.8%
Simcoe®	763	1,338	1,753	1,865	1,614	7.2%
Amarillo®	582	683	1,035	1,217	1,166	5.2%
Chinook	712	723	785	981	1,143	5.1%
Mosaic®	272	728	1,081	1,098	1,113	5.0%
Willamette	469	550	646	620	590	2.7%
Ekuanot™	-	182	438	398	354	1.6%
Cluster	299	274	259	258	272	1.2%
Crystal	191	246	298	278	250	1.1%
Azacca®	-	71	205	234	221	1.0%
El Dorado®	59	181	252	276	218	1.0%
Palisade®	90	184	237	233	212	1.0%
Mt. Rainer	-	-	-	58	174	0.8%
Mt. Hood	170	169	171	168	168	0.8%
Comet	-	-	74	99	132	0.6%
Sterling	-	85	144	102	113	0.5%
Ahtanum™	79	59	63	150	103	0.5%
Other Aroma	1,359	1,589	1,669	1,536	1,578	7.1%
Total Aroma	9,808	12,828	16,092	16,586	16,458	73.9%
Columbus-Tomahawk-Zeus (CTZ)	2,337	2,154	1,820	1,977	2,478	11.1%
Pahto™	-	-	110	399	716	3.2%
Summit™	1,021	656	716	654	637	2.9%
Nugget	659	682	666	604	580	2.6%
Apollo™	399	402	395	371	416	1.9%
Super Galena™	361	206	180	231	270	1.2%
Eureka™	-	-	50	177	219	1.0%
Galena	124	136	122	169	202	0.9%
Bravo™	287	295	295	259	149	0.7%
Other Bitter	389	299	136	136	149	0.7%
Total Bitter	5,577	4,830	4,490	4,978	5,815	26.1%
TOTAL	15,385	17,658	20,582	21,564	22,272	100.0%

The addition of rounded acreage figures may lead to differences in totals in some cases.

Crop volume

The crop 2018 growing season started out warm in the PNW, particularly in April and May which saw temperatures exceeding 30 °C for several days. This led to early flowering in some of the earlier maturing varieties such as **Centennial** and **Cascade**. However, growing conditions throughout the season remained

favourable and with sufficient water supply. As a result, the crop yield overall was only slightly below the strong yields of the prior year but in line with long-term averages for both aroma and bitter varieties. While **Centennial** produced unusually good yields in 2017, this unpredictable variety returned



to disappointing yields in 2018, particularly in Washington where it was down 20%. **Cascade** was variable throughout the PNW region, but came in with a normal yield overall. **Citra**® looked strong up to the start of harvest, but was something of a disappointment with yields only average in Washington and Oregon, and below average in Idaho. **Simcoe**® and **Mosaic**® turned in slightly below-average yields, while **Amarillo**®, **Chinook**, **Nugget**, and **Willamette** were all above average. Babies, both aroma and bitter varieties, were generally on the weak side unless planted on rich soils. Bitter varieties including **CTZ** and **Pahto**™ had slightly above-average yields, with alpha content near long-term averages. For all varieties, pest and disease pressure was manageable throughout the season, resulting in a high-quality crop.

Total production for crop 2018 as reported by the USDA following harvest was 48,493 mt for the PNW region, up 1,153 mt (2%) over crop 2017 as a result of average yields and acreage expansion of 3%. With aroma variety acreage remaining flat and with yields slightly below 2017, total aroma production declined by 757 mt (2%). Conversely, bitter hop production was up 1,909 mt (14%) compared to the previous season due to the bitter variety acreage increase of nearly 17%. Production outside the PNW region is estimated at 680 mt, down from 170 mt (20%) the prior year. The combined total of all US production was 49,173 mt, an increase of 983 mt (2%) over crop 2017 and the second consecutive record-setting year, with total production exceeding 48,000 mt for 2017 and 2018.

Alpha acid table

Variety	2014	2015	2016	2017	2018	Average
Nugget	13.5%	13.6%	12.6%	12.5%	14.1%	13.3%
Columbus-Tomahawk-Zeus (CTZ)	14.5%	13.8%	15.0%	15.4%	15.8%	14.9%
Pahto™	15.3%	17.1%	18.1%	17.4%	17.9%	17.2%
Bravo™	14.6%	14.4%	14.8%	15.5%	14.8%	14.8%
Summit™	15.8%	15.9%	16.7%	15.9%	16.1%	16.1%
Apollo™	18.2%	17.5%	17.5%	16.0%	16.0%	17.0%

Market situation

Contract market

Forward contracting activity picked up shortly after harvest with a focus on new plantings for crop 2019 as well as varietal adjustments and restructuring of existing grower contracts. New contracts were written mainly for additional acres of aroma varieties led by **Citra**® and **Mosaic**®, and also included **El Dorado**®, **Sabro**™, **Cashmere** and a few others. Contract prices remained reasonably strong at prices that will provide grower returns ranging from about 23,500 to 33,000 USD/ha and in a few cases slightly above that depending on variety and yield. Some of the contracts will be planted on new acreage while others will go into fields being converted out of varieties such as **Cascade** and **Centennial** which are both anticipated to see a continued drop in acreage.

Contracting of bitter varieties including **Pahto**™, **Eureka**™ and **CTZ** occurred prior to harvest, but with little alpha activity resuming post-harvest. Contract prices generally were in the range of 39.50 to 48.50 USD/kg alpha and written for short terms. With two consecutive years of moderate acreage increases for the bitter category, contracting activity has

remained cautious and with an eye on further acreage development of **Herkules** in Germany.

As the harvest window shrinks due to the clustering of acreage into varieties that mature at the mid-point of harvest, variety mix has become an important topic in all forward contract discussions. Many US growers are reaching capacity limits for the mid-portion of harvest unless further investment in harvest infrastructure is made.

Spot market crop 2018

Spot volumes of aroma varieties were generally limited as result of average-to-below-average yields for the category. Moderate volumes of spot **Chinook** and **Willamette** were available given stronger yields for these varieties, although demand was light. Relatively small volumes of **Cascade** spots were reported, but also saw little interest from the market. **Centennial** spots were virtually non-existent due to poor yields, while most other aroma hop spots consisted of minor varieties and only small quantities. Aroma variety spots generally were slow to be picked

up in the market, with prices lower than those seen in recent years. Some volumes remained unsold for several months following harvest. Furthermore, aroma variety spots are inherently becoming more limited as production from proprietary varieties now accounts for nearly 50% of the US aroma crop. Proprietary varieties such as **Citra**®, **Simcoe**®, **Amarillo**® and **Mosaic**® are generally contracted on a full-production basis by the variety owners, and therefore spots do not exist under such contract terms.

Similarly to crop 2017, the spot market for bitter varieties was again active as a result of a below-average alpha crop in Germany which prolonged tightness in the global alpha supply balance. However, despite the yield situation in Germany and initially high price expectations in the US, spot alpha demand remained fairly tempered and did not fuel the price escalation seen in the prior year. The moderate amount of **CTZ** hops that existed generally was sold within a few months following harvest at prices in the range of 48.50 to 55.00 USD/kg alpha, with a few purchases reported at slightly higher levels. **Nugget** and **Galena** spots were also picked up at similar prices, as yields were above average for these varieties. Peak prices on a few **CTZ** hops were reported at just below 65.00 USD/kg alpha, but by end of the calendar year the market had simmered down, with a few alpha spots remaining unsold into the winter.

Outside the Pacific Northwest

An estimated 25 to 30 states outside the PNW region harvested approximately 983 ha for crop 2018, which is roughly a 3% reduction from the prior year. The growing season was challenging this year due to a late spring in some states and variable and extreme weather conditions in others. As a result, many yields were variable and below normal, which led to an overall crop estimate of 680 mt for the non-PNW regions, a reduction of about 20% from the prior season. Collectively these regions make up about 4% of the total US acreage led by **Michigan** (304 ha), **New York** (162 ha), **Wisconsin** (120 ha), **Colorado** (60 ha) and **California** (52 ha). Generally, the non-PNW acreage has remained relatively stable, although some of the smallest growers are beginning to exit the industry. Harvesting infrastructure remains fairly limited except among larger growers, and many small growers provide only “wet” (undried) hops to brewers locally. As a whole, the non-PNW production primarily continues to serve local markets in their respective states. However, rather than growing primarily mainstream varieties readily available in the PNW region, growers are beginning to work with researchers to develop and grow varieties suited for their particular growing climates and varieties, providing flavour profiles distinctive from PNW hops.

Area	Variety	Development of acreage			Development of production			
		Acreage ha		Acreage ha	Ø Yield mt/ha		Production mt	
		2017	+/-	2018	2017	2018	2017	2018
Xinjiang	Tsingtao Flower	855	5	860	2.99	3.09	2,556.0	2,660.0
	SA-1	467	-134	333	1.61	1.80	750.0	600.0
	Kirin Flower	193	-40	153	3.63	3.59	700.0	550.0
	Marco Polo	133	0	133	3.76	3.00	500.0	400.0
	Total Xinjiang	1,648	-168	1,480	2.73	2.84	4,506.0	4,210.0
Gansu	Tsingtao Flower	816	95	911	2.64	2.62	2,152.0	2,385.0
	Bitter	177	17	194	1.94	1.90	344.0	369.4
	Aroma	42	-19	23	1.00	1.20	42.0	27.6
	Total Gansu	1,035	93	1,128	2.45	2.47	2,538.0	2,782.0
	Total Aroma	509	-153	356	1.56	1.76	792.0	627.6
	Total Bitter	2,174	77	2,251	2.88	2.83	6,252.0	6,364.4
	CHINA TOTAL	2,683	-75	2,608	2.63	2.68	7,044.0	6,992.0

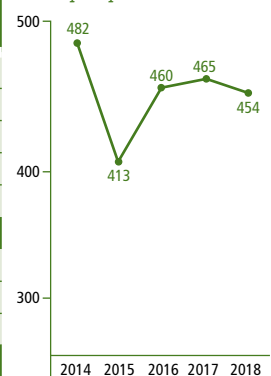
Farm structure

In crop year 2018 there were 22 farms growing hops in China. On average, each of these farms cultivated hops on an area of 119 ha (2017: 112 ha). In the **Xinjiang** growing region, 13 farms continued hop production (2017: 15 farms). The average planted area rose to

114 ha (2017: 110 ha) per farm. The number of farms in the **Gansu** region remained unchanged year on year at nine. Due to the expansion of hop acreage, the average planted area per farm increased to 125 ha (2017: 115 ha).



Alpha production in mt



The addition of rounded acreage figures may lead to differences in totals in some cases.

There are no reliable statistics on acreage and production volume in China. The figures presented here which, due to the size of the Chinese hop-growing regions, are often based on estimates, have been gathered using our own sources.

CHINA

Acreage/crop volume/alpha content

Hop acreage developed differently in the two hop-growing regions: **Xinjiang** lost 10% of its acreage; in **Gansu**, acreage increased by 9%. There was a remarkable shift within the varietal mix. **Aroma** acreage declined by 30%, while **bitter** acreage increased by 4%. The changes in acreage throughout the country resulted in an overall decline of 3%.

In the **Xinjiang** region, conditions in spring were unusually warm. Due to substantial rainfall in early April, pruning was delayed by a week. The extreme weather and climate events that are usually caused by cold air activity in the late spring failed to materialise in 2018. The summer was the second-warmest ever recorded. The production yield of 2.84 mt/ha slightly exceeded the long-term average. In the **Gansu** region, pruning took place between 10 March and 10 April, depending on the district. Throughout the entire vegetation phase there were no continuous periods of high or low temperatures. The average production yield of 2.47 mt/ha was slightly below the multi-year average.

The average alpha acid content for China as a whole was 6.5%, which was close to the multi-year average.

The alpha acid content of the main variety **Tsingtao Flower** was 5.9%, as opposed to 6% in crop year 2017. The alpha yield decreased overall by 2%.

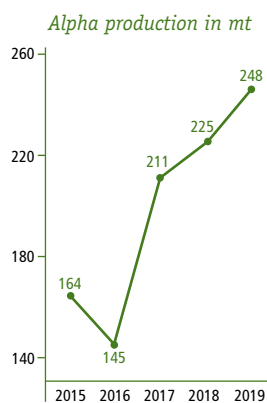
Market situation

In China there is nothing comparable to the forward contract market in Europe or the USA. Instead, it is customary for farmers and buyers to conclude purchase agreements. These agreements only contain defined quantities and qualities. The actual price is settled at a later date.

The small quantities of unsold hops from crop 2017 were sold by September 2018. All hops harvested in crop year 2018 were also sold. The lowest price paid was approx. 3.00 EUR/kg for the **Tsingtao Flower** variety, with the highest prices of slightly below or above 4.00 EUR/kg being paid for **bitter** and **aroma varieties**.

According to the information we have obtained, acreage in crop year 2019 will decrease again slightly to approx. 2,500 ha.

CROP 2019: AUSTRALIA



The addition of rounded acreage figures may lead to differences in totals in some cases.

Area	Variety	Development of acreage			Development of production			
		Acreage ha			Ø Yield mt/ha		Production mt	
		2018	+/-	2019	2018	2019	2018	2019
Victoria	Galaxy™	182	16	198	2.41	2.47	437.8	488.2
	Vic Secret™	75	0	75	2.70	3.10	203.2	232.0
	Super Pride	52	0	52	2.15	1.25	112.7	65.8
	Pride of Ringwood	47	0	47	2.02	1.06	95.0	50.0
	Topaz	23	0	23	2.97	2.90	69.2	65.8
	Ella™	13	0	13	3.06	2.78	39.5	35.8
	Other	0	3	3	0.00	0.80	0.0	2.8
	Total Victoria	393	18	411	2.44	2.29	957.4	940.4
Tasmania	Galaxy™	112	6	118	2.85	2.67	319.2	316.0
	Enigma™	35	18	53	1.15	1.69	40.4	90.0
	Super Pride	40	0	40	2.44	2.29	96.9	91.0
	Ella™	37	0	37	2.33	2.64	85.8	97.2
	Pride of Ringwood	13	0	13	3.79	4.10	49.0	53.0
	Other	23	5	28	1.48	2.07	33.6	57.1
	Total Tasmania	259	30	289	2.41	2.44	624.9	704.3
	AUSTRALIA TOTAL	652	48	700	2.43	2.35	1,582.3	1,644.7

Farm structure

The six growers each farmed an average of 117 ha, compared to 109 ha the previous year.

Australia's largest hop grower, Hop Products Australia (HPA), has planted 50 ha on its new farm in Buffalo River Valley in the Victoria region with its own proprietary hop varieties. This is the first stage in an

expansion project valued at AUD 35 million, which includes building a new harvest complex with kiln floors. 150 ha are to be planted in the first phase, followed by the addition of a further 150 ha in the second phase.

Acreage/crop volume/alpha content

Australia's hop acreage increased by 7%, with a 5% acreage increase in Victoria and a recorded increase of 12% in Tasmania. The new plantings mainly comprised the proprietary varieties **Galaxy™** and **Enigma™**.

The hops in Victoria were exposed to long heatwaves. Using irrigation systems, it was possible to avoid crop losses and achieve a good crop volume. A lack of precipitation combined with record night temperatures in March meant that the cones ripened slightly later than in previous years.

In Tasmania, devastating bushfires raged throughout January, just as the hop plants were in burr. Although these conditions had no effect on the yield, they serve as an indication of the hot and dry conditions that characterised the season. Between the end of December and the end of February, there was hardly any rainfall and an above-average increase in day temperatures.

Nevertheless, crop yield in Australia as a whole was above the average of the last five years, with yields slightly below average in Victoria and slightly above average in Tasmania.

The average alpha content in the three main varieties in crop year 2019 compared to the previous year: **Galaxy™** 14.8% (2018: 15.7%), **Super Pride** 14.0% (2018: 12.9%), **Vic Secret™** 19.4% (2018: 19.5%). Total alpha acid yield in 2019 increased by 10% year on year.

Market situation

The quantity harvested in 2019 was sufficient to meet the contractual commitments for all varieties, which totalled 90% of the production volume.

In May 2019, the forward contract rate for the 2020 crop was already approx. 90%.

The description of the weather conditions and plant development refers to a report by Hop Products Australia (HPA) regarding its own farms.

Contract rates up to crop year 2022, page 14

HOP PLANT DEVELOPMENT 2019

Germany (Hallertau)

Above-average precipitation in December brought the long drought in 2018 to an end. In January, too, precipitation was plentiful, relieving the situation regarding soil moisture to such an extent that by the end of the month there was an adequate water supply available. In addition, freezing temperatures in the second half of the month led to good frost action in the upper soil segment.

Mild, sunny weather conditions in February dried the superficial soil layers, making the ground very suitable for the coming spring work at the end of the month. As a result, pruning of the hop plants could begin in ideal conditions in early March. In April, the soil continued to dry due to both an occasionally brisk east wind and too little precipitation. In addition, the warm above-average temperatures continued, leading to rapid juvenile development of the hop plants. Consequently, shoot training began throughout the region in the week after Easter, slightly earlier than the long-term average. Distinctly cool conditions in May, with night-time temperatures as low as freezing point, held back plant growth until plentiful rainfall in the last ten days of May brought the spring dry period to an end. Rising temperatures made for ideal growing conditions towards the end of the reporting period, bringing the plants to a vegetation stage that was in line with the long-term average.

Due to the dry spring weather conditions, up until the beginning of June the incidence of disease was comparatively minor. On the whole, pest infestation also remains relatively low.

USA (Pacific Northwest – PNW)

During the winter of 2018-19 in the PNW the months of December and January were fairly dry and mild. Several days saw temperatures reach into the 10–15 °C range. The mild weather conditions changed significantly in the first week of February in Washington. Over 60 cm of snow hit the Yakima Valley during the month and temperatures dropped to -18 °C for a number of days. Snow cover remained on the ground for a month and it was not until the first week of April before growers could get spring work started. Fortunately, there appeared to be sufficient labor available, and after for a number of weeks, most growers were able to catch up by the middle of May. Training of the vines was completed within the normal timeframe for most growers and rhizomes and pots were planted throughout April and May.

Oregon experienced above normal precipitation in late winter and early spring. Localized flooding was experienced in some lower lying hop fields. The spring rains presented challenges for the Oregon growers to perform the early season work but most were able to complete the work by end of May.

The Idaho hop region did not experience the same weather patterns as was encountered in Washington and Oregon. There was very little interruption of work as weather conditions remained favorable.

Despite the significant snowfall in February and early March, portions of Washington State have subsequently been classified as being in drought conditions for the 2019 irrigation season. Regardless, there does not appear to be a significant threat to water availability

HOP PLANT DEVELOPMENT 2019

for the hop crop, even in areas with junior water rights. Much of the drought classification pertains to Western Washington and not to the hop growing regions. Overall, by early June the crop development in the

PNW region is looking healthy and normal for this time of year. Some of the baby crop in Washington is behind schedule due to planting delays while mature fields look strong at this point.

OUTLOOK 2019

Germany

The total area strung for crop year 2019 amounts to 20,417 ha. This figure has increased by 274 ha over 2018, which represents a rise of 1.4%. The most significant expansion has been seen among the varieties that already covered the largest acreage, i.e. Herkules, Perle and Hallertau Tradition. These “top three” now account for a combined share of 61% of German hop-growing acreage.

The area planted with aroma varieties has grown overall by 37 ha (0.3%) to 11,222 ha. However, the aroma share of total acreage has fallen by 0.5% to 55%. Acreage expansion has focused on Perle (+145 ha), Hallertau Tradition (+58 ha) and Spalt Select (+33 ha). On the other hand, the brunt of acreage reduction has been borne by Amarillo (-94 ha), Saphir (-23 ha) and Mandarinina Bavaria (-23 ha).

The area planted with bitter varieties has grown by 237 ha (+2.6%) to 9,195 ha. Their share of total hop acreage has risen by 0.5% to 45%. The most significant acreage increases have been seen by Herkules (+245 ha) and Polaris (+50 ha). The acreage reductions have mainly affected Hallertau Magnum (-38 ha) and Hallertau Taurus (-30 ha).

USA (PNW)

The US Department of Agriculture hop acreage report indicates that a total of 23,205 ha has been strung for the crop 2019 season, which represents an increase of 932 ha (+ 4%) over the prior year. In the aroma category, proprietary varieties are the sole driving force behind the increase of 774 ha (+5%). The area planted with Citra® has increased by 1,074 ha (+42%), which further solidifies its position as the top acreage variety in the

US at 3,656 ha (16% share). Mosaic® has added 597 ha (+54%), while the area planted with the relatively new variety Sabro™ has risen by over 300%, bringing its total acreage to 274 ha. El Dorado® also continues to gain momentum, with a further 171 ha being added (+79%). Simcoe® likewise has picked up slightly with an increase of 153 ha (+9%). Amarillo®, however, will rebalance for a second consecutive year with a decrease of 221 ha (-19%).

Almost all of the public varieties continue to shed acreage, the only exception being the relatively new variety Cashmere which saw its acreage increase by 126 ha. Centennial will drop another 395 ha (-20%) and Cascade will shed 362 ha (-14%). Chinook joins with a reduction of 185 ha (-16%), while Willamette also continues its downward trend with a decrease of 140 ha (-24%).

Bitter varieties continue their slight upward trend, however, with an increase of 159 ha (+3%) for crop 2019. Pahto™ leads the expansion here, adding 155 ha (+22%), followed closely by Eureka™ which has added 136 ha (+62%) and CTZ at plus 130 ha (+5%). Summit™ has trimmed 203 ha (-32%), but this is partially offset by an increase of 126 ha for Pekko™. Nugget acreage will decline by a further 104 ha (-18%). The ratio of aroma to bitter variety acreage in the PNW region remains unchanged at 74% to 26%.

World

In crop year 2019, the total planted area for hops worldwide is about 61.500 ha, which represents a year-on-year increase of approx. 1.100 ha, or 1.8%.

Conversion table weights and measures

Area:	Weight:
1 hectare (ha) = 10,000 m ² = 2.471 acres	1 metr. ton (mt) = 1,000 kg = 20 Ztr. (DE) = 2,204.6 lbs
1 acre = 0.4047 ha	1 Zentner Ztr. (DE) = 50 kg = 110.23 lbs = 1.102 cwt (US)
	= 110.23 lbs = 0.984 cwt (GB)
	1 hundredweight (cwt/USA) = 100 lbs = 45.36 kg
	= 0.9072 Ztr.
	1 hundredweight (cwt/GB) = 112 lbs = 50.800 kg
	= 1.0160 Ztr.
Volume:	1 centner (GB) = 100 lbs = 45.36 kg
1 hl = 100 l = 26.42 gall = 0.8523 bbl (US)	= 0.9072 Ztr.
1 hl = 100 l = 22.01 gall = 0.6114 bbl (GB)	1 kg = 2.20462 lbs
1 barrel (bbl/USA) = 31 gall = 1.1734 hl	1 lb = 0.45359 kg
1 barrel (bbl/GB) = 36 gall = 1.6365 hl	

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THE BARTH-HAAS CAMPUS

Beer playground and flavour workshop

From the 1980s to 2006, hops increasingly suffered a wallflower-like existence as a flavouring raw material for beer. Their importance declined steadily until they were merely taken for granted. But while the hop industry seemed to be trapped in an everlasting recession, something astonishing was happening in a tiny niche in the US brewing sector. In the late 1970s, a group of courageous, creative home brewers began experimenting with that very same raw material and starting up businesses. They created new beer recipes, resurrected old, long-forgotten beer styles, or simply invented completely new ones. This won them increasing numbers of enthusiastic fans and supporters. In the past ten to fifteen years, craft beer has grown beyond niche status in the USA, gone global and, above all, irrevocably changed attitudes among brewers everywhere, big and small, and among consumers with regard both to flavour and to hops.

The BARTH-HAAS Group is passionately motivated by the vision of being “the hop experts for the best beers in the world”. The newly created BARTH-HAAS Campus at Freiligrathstraße 7/9 in Nuremberg is a visible expression of this.

All the senses are catered for here. Not only the auditory or visual senses, but also the haptic ones get their money’s worth. “Smell, taste, feel” is the motto.

An area of around 500 square metres has been devoted to providing a permanent home for the BARTH-HAAS Hops Academy. In addition to a comfortable seminar room, there is a fully equipped professional kitchen with preparation room and an interactive sensory tunnel which leads to a professional flavour workshop with an adjoining sensory studio. The studio looks directly onto the gleaming state-of-the-art 80-litre Kaspar Schultz brewing plant. A tap room with a fully equipped dispensing bar and tables and chairs for beer events adds the finishing touch.

The BARTH-HAAS Campus will inspire our customers and partners and enable them together with us to venture into new dimensions in product development.

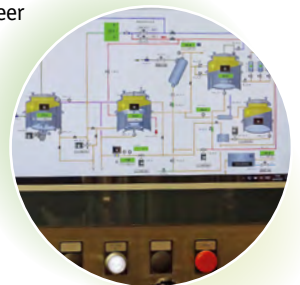
The seminar room regularly serves as the venue for Hop Flavorist courses, intensive courses that focus on sensory analysis of varietal diversity and are offered at various levels.

In the sensory studio, brewers and buyers undergo basic training in professional hop selection. In the flavour workshop, with the support of a software tool, brewers, buyers, developers and hop growers learn to calibrate their senses and define the flavour profiles of their products.

The new concept brewery is designed for experimenting and developing. Completed at the beginning of 2019, the brewing plant is the sparkling centrepiece of the Campus: the semi-automatic four-vessel brew house is small and flexible enough for trying out a wide variety of different techniques, hop varieties and new products. The brewing system permits hop addition at any stage of the brewing process. A special feature of the equipment is the “hop rocket”, a movable dosage system that can be integrated into the brewing process as desired.

The users of the campus brewery are given support, inspiration and specialist advice by the brewing engineers and flavour experts in the Brewing Solutions Team led by Dr Christina Schönberger. What particularly appeals to her is the fact that the BARTH-HAAS Hops Academy, which was set up in 2011, has not only found a new home on the campus, but is also integrated into a holistic concept that expresses our appreciation both for beer as a special product and for hops as a wonderful plant.

The BARTH-HAAS Campus is a beer playground. Anything can be tried out. Failure is permitted – as is the conquest of new horizons. The BARTH-HAAS Campus thus sets new standards and now invites brewers, buyers, developers, hop growers and our partners in brewing schools and research establishments to come along and experiment, develop, play and learn.



Our thanks go to all those bodies and individuals who provide us with information and thus contribute to the success of the Barth Report.

