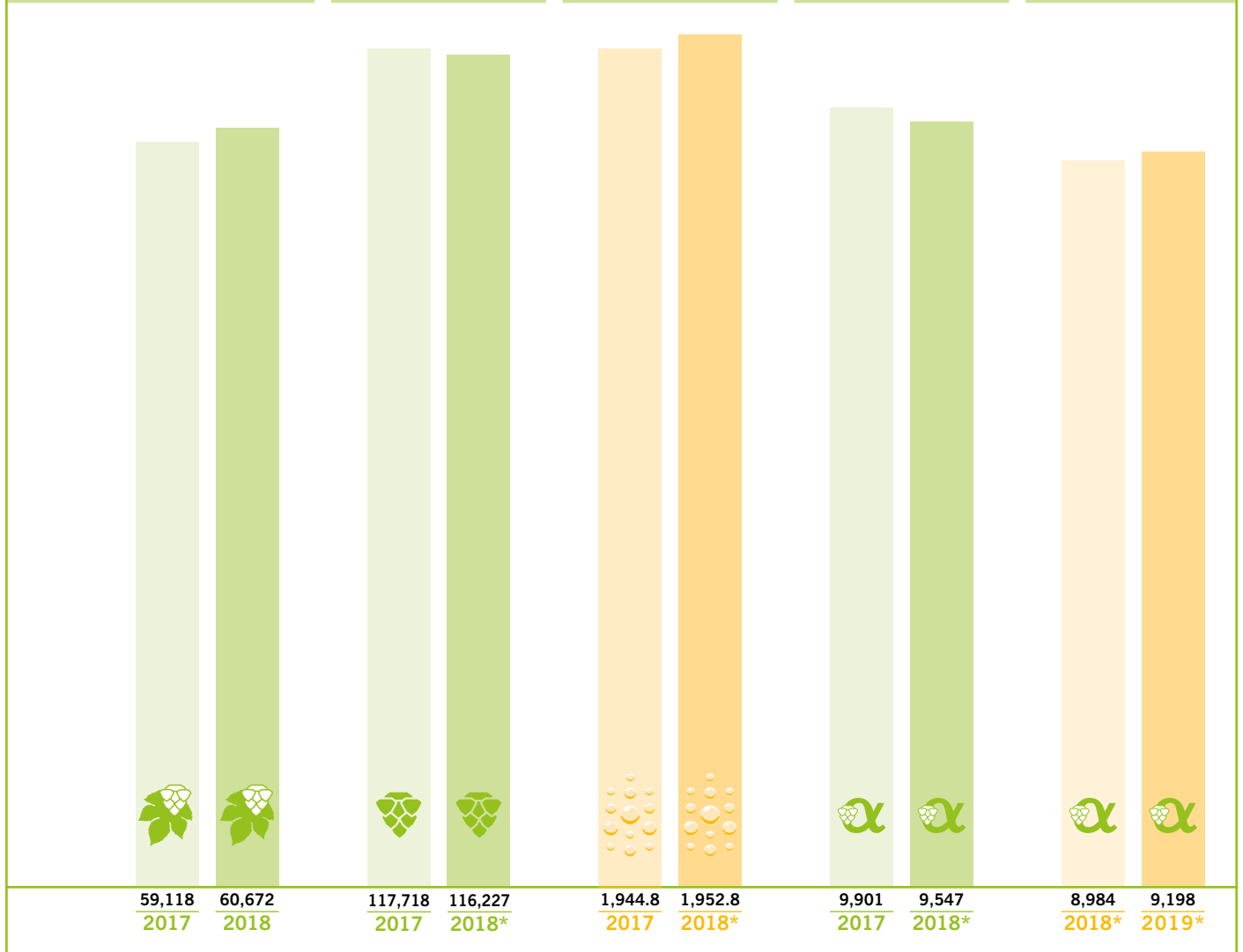


2018
GUIDELINES
FOR HOP BUYING

	World Hop Acreage	World Hop Crop	World Beer Production	World Alpha Acids Production	World Alpha Acids Demand
	(ha)	(mt)	(Mio. hl)	(mt)	(mt)
2016	56,261 + 8.9 %	110,496 + 26.5 %	1,960,5 - 0.3 %	9,373 + 37.1 %	8,825 - 0.3 %
2017	59,118 + 5.1 %	117,718 + 6.5 %	1,944,8 - 0.8 %	9,901 + 5.6 %	8,947 + 1.4 %
2018	60,672 + 2.6 %	116,227* - 1.3 %*	1,952,8* + 0.4 %*	9,547* - 3.6 %*	8,984* - 0.4 %*
2019	- -	- -	1,956,8* + 0.2 %*	- -	9,198* + 2.4 %*



*Estimate

International Conversion Table

1 metr. ton (mt) → 1,000 kg → 2,204.6 lbs.
 100 lbs. → 45.359 kg

1 hectare (ha) → 2.471 acres
 1 acre → 0.405 hectare (ha)

1 hectolitre (hl) → 100 litres (Ltr.) → 0.8523 bbl. [USA] → 0.6114 bbl. [Brit.]
 1 bbl. [USA] → 117.34 litres (Ltr.) → 1.1734 hectolitres (hl)
 1 bbl. [Brit.] → 163.65 litres (Ltr.) → 1.6365 hectolitres (hl)

Foreword

” In recent years, the European hop growing regions have experienced significant, weather-related, fluctuations. Also, for 2018, the adverse growing conditions, with already high temperatures in spring followed by a hot and dry summer, produced in most European growing regions a below average crop, with lower yields as well as alpha acid concentrations. The USA had a normal hop crop, which is certainly due to the use of irrigation but also a variety mix which seems more suitable for higher temperatures.

The hop producing regions in Europe will not only have to invest into irrigation systems but also develop varieties suitable for the changing climate conditions. More recent variety releases have demonstrated a more consistent production, even on non-irrigated fields.

The hop crop in Europe has varied tremendously in recent years due to adverse growing conditions. Crop 2018 has presented another challenging result for the market. The crop in USA was normal. The difference between the two regions can largely be traced to the widespread lack of irrigation in Europe as well as the greater range of varieties in USA that do not suffer in hot, dry conditions. It is imperative that hop breeding in Germany begins to produce newer, more resistant versions of standard varieties and that municipalities where hops are grown allow growers to irrigate their crops as needed.

“

Your Hopsteiner Team
November 2018



- *Hallertauer Hopfenveredelungs-
gesellschaft mbH
Au, Hallertau, Pelletwerk*
- *Hallertauer Hopfenveredelungs-
gesellschaft mbH
Mainburg, Hallertau,
Ethanol- und CO₂-Extraktion*
- *Hops Extract Corporation
of America, Yakima, Washington,
CO₂-Extraktion*
- *Golden Gate Hop Ranches Inc.
Yakima, Washington,
Hopfenanbaubetrieb*

Hop Acreage 2015 – 2018

	Acreage in ha				+/- %		
	2015	2016	2017	2018	15/16	16/17	17/18
Hallertauer	557	553	539	503	- 0.7	- 2.5	- 6.7
Hersbrucker	950	934	910	918	- 1.7	- 2.6	+ 0.9
Perle	2,868	2,780	2,653	2,681	- 3.1	- 4.6	+ 1.1
Spalter Select	443	440	437	468	- 0.7	- 0.7	+ 7.1
Tradition	2,790	2,704	2,592	2,580	- 3.1	- 4.1	- 0.5
Saphir	387	400	416	435	+ 3.4	+ 4.0	+ 4.6
Northern Brewer	150	157	162	156	+ 4.7	+ 3.2	- 3.7
Magnum	1,671	1,527	1,387	1,364	- 8.6	- 9.2	- 1.7
Nugget	137	129	119	116	- 5.8	- 7.8	- 2.5
Taurus	440	340	270	244	- 22.7	- 20.6	- 9.6
Herkules	3,836	4,540	5,406	5,897	+ 18.4	+ 19.1	+ 9.1
Rest	681	1,009	1,419	1,418	+ 48.2	+ 40.6	- 0.1
Hallertau	14,910	15,510	16,310	16,780	+ 4.0	+ 5.2	+ 2.9
Elbe-Saale	1,325	1,409	1,466	1,541	+ 6.3	+ 4.0	+ 5.1
Tettngang	1,237	1,282	1,353	1,397	+ 3.6	+ 5.5	+ 3.3
Spalt	355	376	391	404	+ 5.9	+ 4.0	+ 3.3
Rest	20	22	22	22	+ 10.0	+ 0.0	+ 0.0
Germany total	17,847	18,598	19,543	20,144	+ 4.2	+ 5.1	+ 3.1
Austria	249	249	250	252	+ 0.0	+ 0.4	+ 0.8
Belgium	148	149	180	183	+ 0.7	+ 20.8	+ 1.7
Bulgaria	14	18	22	37	+ 28.6	+ 22.2	+ 68.2
Czech Rep.	4,622	4,775	4,945	5,026	+ 3.3	+ 3.6	+ 1.6
England	895	919	967	972	+ 2.7	+ 5.2	+ 0.5
France	440	459	481	496	+ 4.3	+ 4.8	+ 3.1
Poland	1,424	1,475	1,577	1,577	+ 3.6	+ 6.9	+ 0.0
Romania	270	270	270	277	+ 0.0	+ 0.0	+ 2.6
Russia	218	420	470	470	+ 92.7	+ 11.9	+ 0.0
Slovakia	137	137	138	138	+ 0.0	+ 0.7	+ 0.0
Slovenia	1,403	1,484	1,590	1,667	+ 5.8	+ 7.1	+ 4.8
Spain	534	536	537	537	+ 0.4	+ 0.2	+ 0.0
Turkey	350	350	350	350	+ 0.0	+ 0.0	+ 0.0
Ukraine	369	369	369	369	+ 0.0	+ 0.0	+ 0.0
Rest	194	194	183	181	+ 0.0	- 5.7	- 1.1
Europe total	29,114	30,402	31,872	32,676	+ 4.4	+ 4.8	+ 2.5
Apollo	402	393	369	415	- 2.2	- 6.1	+ 12.4
Bravo	297	293	257	150	- 1.3	- 12.3	- 41.6
Cascade	2,748	3,068	2,811	2,432	+ 11.6	- 8.4	- 13.5
Centennial	1,781	2,057	2,132	1,968	+ 15.5	+ 3.7	- 7.7
Chinok	723	785	981	1,149	+ 8.6	+ 25.0	+ 17.1
Col. / Tom. / Zeus	2,154	1,820	1,977	2,469	- 15.5	+ 8.6	+ 24.9
Eureka!	26	50	147	220	+ 92.3	+ 193.0	+ 50.2
Nugget	682	666	604	601	- 2.3	- 9.3	- 0.5
Super Galena	212	153	203	274	- 27.8	+ 32.7	+ 35.1
Willamette	550	632	620	567	+ 14.9	- 2.0	- 8.4
Rest	8,081	10,664	11,465	12,148	+ 32.0	+ 7.5	+ 6.0
PNW total	17,656	20,581	21,564	22,394	+ 16.6	+ 4.8	+ 3.9
Others	505	852	1,011	931	+ 68.7	+ 18.7	- 7.9
USA total	18,161	21,433	22,575	23,325	+ 18.0	+ 5.3	+ 3.3
Argentina	195	195	160	160	+ 0.0	- 17.9	+ 0.0
Australia	488	546	631	652	+ 11.9	+ 15.6	+ 3.3
Japan	154	154	120	120	+ 0.0	- 22.1	+ 0.0
New Zealand	388	412	442	531	+ 6.2	+ 7.3	+ 20.1
P.R.China	2,574	2,508	2,415	2,302	- 2.6	- 3.7	- 4.7
South Africa	402	413	424	427	+ 2.7	+ 2.7	+ 0.7
Rest	164	198	479	479	+ 20.7	+ 141.9	+ 0.0
World total	51,640	56,261	59,118	60,672	+ 8.9	+ 5.1	+ 2.6

Hop Acreage 2005 – 2018

(ha and % share)

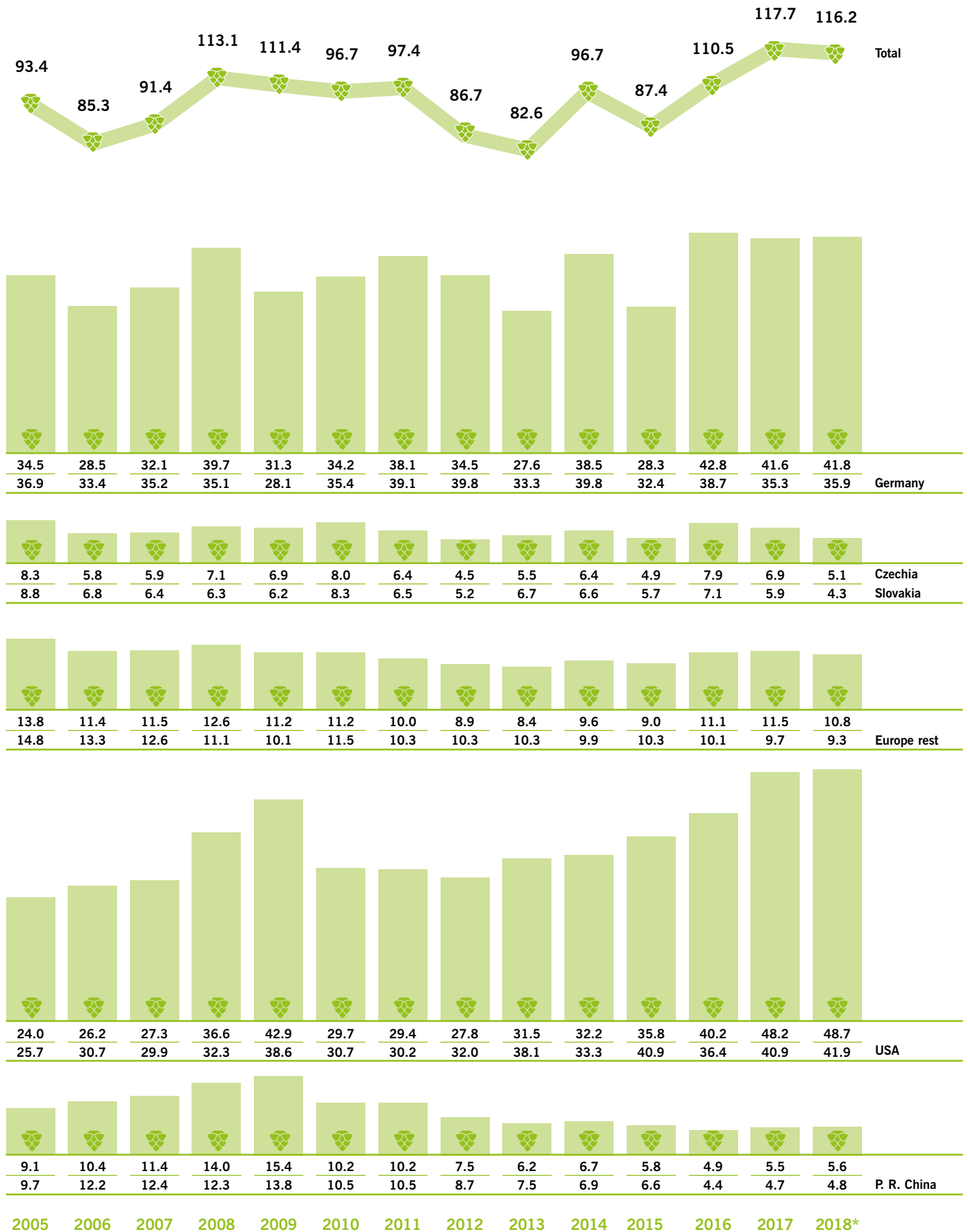


Crop Quantities and Average Yields 2015 – 2018

	Crop Quantities in mt				+/- %			Ø Yields in mt / ha			
	2015	2016	2017	2018*	15/16	16/17	17/18*	2015	2016	2017	2018*
Hallertauer	618.6	982.9	730.3	460.0	+ 58.9	- 25.7	- 37.0	1.11	1.78	1.35	0.91
Hersbrucker	1,361.7	1,914.0	1,806.2	1,910.0	+ 40.6	- 5.6	+ 5.7	1.43	2.05	1.98	2.08
Perle	3,917.8	6,461.6	5,184.2	4,940.0	+ 64.9	- 19.8	- 4.7	1.37	2.32	1.95	1.84
Spalter Select	625.8	999.1	901.4	880.0	+ 59.7	- 9.8	- 2.4	1.41	2.27	2.06	1.88
Tradition	3,882.8	6,234.2	5,009.9	5,125.0	+ 60.6	- 19.6	+ 2.3	1.39	2.31	1.93	1.99
Saphir	541.6	876.6	798.3	820.0	+ 61.9	- 8.9	+ 2.7	1.40	2.19	1.92	1.89
Northern Brewer	180.2	304.7	235.8	205.0	+ 69.1	- 22.6	- 13.1	1.20	1.94	1.46	1.31
Magnum	2,892.0	3,254.9	3,186.6	2,095.0	+ 12.5	- 2.1	- 34.3	1.73	2.13	2.30	1.54
Nugget	249.3	320.9	327.8	280.0	+ 28.7	+ 2.2	- 14.6	1.82	2.49	2.75	2.41
Taurus	685.4	753.6	548.0	500.0	+ 10.0	- 27.3	- 8.8	1.56	2.22	2.03	2.05
Herkules	8,062.3	13,019.3	14,243.6	16,300.0	+ 61.5	+ 9.4	+ 14.4	2.10	2.87	2.63	2.76
Others	856.6	1,831.7	2,568.3	3,005.0	+ 113.8	+ 40.2	+ 17.0	1.26	1.82	1.81	2.12
Hallertau	23,874.1	36,953.5	35,540.2	36,520.0	+ 54.8	- 3.8	+ 2.8	1.60	2.38	2.18	2.18
Elbe-Saale	2,355.3	2,845.4	2,938.8	2,500.0	+ 20.8	+ 3.3	- 14.9	1.78	2.02	2.00	1.62
Tettngang	1,694.9	2,194.2	2,270.4	2,100.0	+ 29.5	+ 3.5	- 7.5	1.37	1.71	1.68	1.50
Spalt	376.6	730.0	762.2	632.0	+ 93.8	+ 4.4	- 17.1	1.06	1.94	1.95	1.56
Rest	35.8	43.0	44.7	45.0	+ 20.1	+ 4.0	+ 0.7	1.79	1.95	2.03	2.05
Germany total	28,336.7	42,766.1	41,556.3	41,797.0	+ 50.9	- 2.8	+ 0.6	1.59	2.30	2.13	2.07
Austria	298.0	480.0	439.0	445.0	+ 61.1	- 8.5	+ 1.4	2.01	3.22	1.31	1.77
Belgium	187.0	198.0	236.0	217.0	+ 5.9	+ 19.2	- 8.1	1.26	1.33	2.82	1.19
Bulgaria	26.0	38.0	62.0	53.5	+ 46.2	+ 63.2	- 13.7	0.03	0.04	1.84	1.45
Czech Rep.	4,842.6	7,711.6	6,797.0	4,900.0	+ 59.2	- 11.9	- 27.9	1.05	1.61	1.59	0.97
England	1,357.0	1,400.0	1,780.0	1,120.0	+ 3.2	+ 27.1	- 37.1	1.52	1.52	1.71	1.15
France	555.0	772.0	763.0	833.0	+ 39.1	- 1.2	+ 9.2	0.39	0.52	1.90	1.68
Poland	2,242.0	3,043.0	2,993.0	2,530.0	+ 35.7	- 1.6	- 15.5	1.57	2.06	0.76	1.60
Romania	195.0	195.0	205.0	195.0	+ 0.0	+ 5.1	- 4.9	0.89	0.46	1.06	0.70
Russia	162.0	444.0	500.0	500.0	+ 174.1	+ 12.6	+ 0.0	1.18	3.24	0.75	1.06
Slovakia	94.0	187.0	104.0	152.0	+ 98.9	- 44.4	46.2	0.07	0.13	1.72	1.10
Slovenia	1,677.6	2,476.0	2,736.0	2,900.0	+ 47.6	+ 10.5	+ 6.0	1.20	1.67	1.02	1.74
Spain	1,115.0	946.0	550.0	900.0	- 15.2	- 41.9	+ 63.6	0.24	0.20	1.37	1.68
Turkey	390.0	390.0	390.0	390.0	+ 0.0	+ 0.0	+ 0.0	1.11	1.11	1.11	1.11
Ukraine	480.0	480.0	560.0	475.0	+ 0.0	+ 16.7	- 15.2	1.30	1.30	1.52	1.29
Rest	296.0	279.5	261.5	257.0	- 5.6	- 6.4	- 1.7	1.53	1.44	1.43	1.42
Europe total	42,253.9	61,806.2	59,932.8	57,664.5	+ 46.3	- 3.0	- 3.8	1.45	2.03	1.88	1.76
Apollo	1,146.8	943.7	1,032.6	1,061.0	- 17.7	+ 9.4	+ 2.8	2.85	2.40	2.80	2.56
Bravo	926.4	855.8	844.6	381.0	- 7.6	- 1.3	- 54.9	3.12	2.92	3.29	2.54
Cascade	5,885.0	5,816.1	6,179.8	5,103.0	- 1.2	+ 6.3	- 17.4	2.14	1.90	2.20	2.10
Centennial	2,345.4	3,085.2	3,959.1	2,894.0	+ 31.5	+ 28.3	- 26.9	1.24	1.50	1.86	1.47
Chinook	1,466.6	1,317.1	1,919.7	2,282.0	- 10.2	+ 45.8	+ 18.9	2.03	1.68	1.96	1.99
Col./Tom./Zeus	6,610.0	4,793.4	6,356.1	7,076.0	- 27.5	+ 32.6	+ 11.3	3.07	2.63	3.22	2.87
Eureka!	56.0	117.0	368.5	580.0	+ 108.9	+ 215.0	+ 57.4	2.15	2.34	2.52	2.64
Nugget	1,447.0	1,424.7	1,239.1	1,501.0	- 1.5	- 13.0	+ 21.1	2.12	2.14	2.05	2.50
Super Galena	612.9	410.3	586.0	712.0	- 33.1	+ 42.8	+ 21.5	2.88	2.68	2.89	2.59
Willamette	686.5	1,015.7	972.3	948.0	+ 48.0	- 4.3	- 2.5	1.25	1.61	1.57	1.67
Rest	14,062.5	19,746.9	23,881.9	25,400.0	+ 40.4	+ 20.9	+ 6.4	1.76	1.85	2.08	2.09
PNW total	35,197.7	39,525.9	47,339.7	47,938.0	+ 12.3	+ 19.8	+ 1.3	1.99	1.92	2.20	2.14
Others	566.5	680.4	850.5	789.0	+ 20.1	+ 25.0	- 7.2	1.12	0.80	0.84	0.85
USA total	35,764.2	40,206.3	48,190.2	48,727.0	+ 12.4	+ 19.9	+ 1.1	1.97	1.88	2.13	2.09
Argentina	300.0	300.0	215.0	280.0	+ 0.0	- 28.3	+ 30.2	1.54	1.54	1.34	1.75
Australia	1,200.5	1,104.8	1,438.0	1,582.0	- 8.0	+ 30.2	+ 10.0	2.46	2.02	2.28	2.43
Japan	300.0	300.0	273.0	273.0	+ 0.0	- 9.0	+ 0.0	1.95	1.95	2.28	2.28
New Zealand	740.0	794.0	760.0	722.0	+ 7.3	- 4.3	- 5.0	1.91	1.93	1.72	1.36
P.R.China	5,790.0	4,880.0	5,530.0	5,580.0	- 15.7	+ 13.3	+ 0.9	2.25	1.95	1.67	2.42
South Africa	769.4	865.0	710.0	754.0	+ 12.4	- 17.9	+ 6.2	0.30	0.34	2.29	1.77
Rest	240.0	239.7	669.0	644.0	- 0.1	+ 179.1	- 3.7	1.46	1.22	1.40	1.34
World total	87,358.0	110,496.0	117,718.0	116,226.5	+ 26.5	6.5	- 1.3	1.69	1.96	1.99	1.92

World Hop Crop 2005 – 2018

(1.000 mt and % share)



*Estimate

Hopsteiner Laboratory Values 2015 – 2018

Alpha Content in %					Alpha Content in %				
Aroma Varieties	2015	2016	2017	2018	Bitter Varieties	2015	2016	2017	2018
Hersbrucker	2.3	2.8	2.3	2.0	Herkules	15.1	17.3	15.5	14.6
Perle	4.5	8.2	6.9	5.5	Magnum	12.6	14.3	12.6	11.6
Tradition	4.7	6.4	5.7	5.0	Taurus	12.9	17.6	15.9	13.6
Select	3.2	5.2	4.6	3.5	US Super Galena	15.4	15.1	15.3	15.0
Tettnang	2.1	3.8	3.6	3.0	US Bravo	14.4	14.8	15.5	14.8
Spalt	2.2	4.3	3.2	3.5	US Nugget	14.4	12.5	13.4	13.7
Saaz	2.1	3.4	3.0	2.9	US Summit	16.2	16.5	17.3	15.8
Steirer Aurora	8.5	8.7	7.3	8.9	US CTZ	15.6	14.2	15.8	15.0
Steirer Golding	3.2	3.2	2.8	3.0	Pride of Ringwood	9.0	9.4	9.8	9.6
US Cascade	6.6	6.1	7.0	6.0					
US Willamette	5.2	4.8	5.1	4.5	Dual Purpose	2015	2016	2017	2018
Northern Brewer	5.4	10.5	7.8	7.4	US Centennial	9.9	10.0	11.0	10.0

Worldwide use of Hops and Hop Products 2005 – 2018

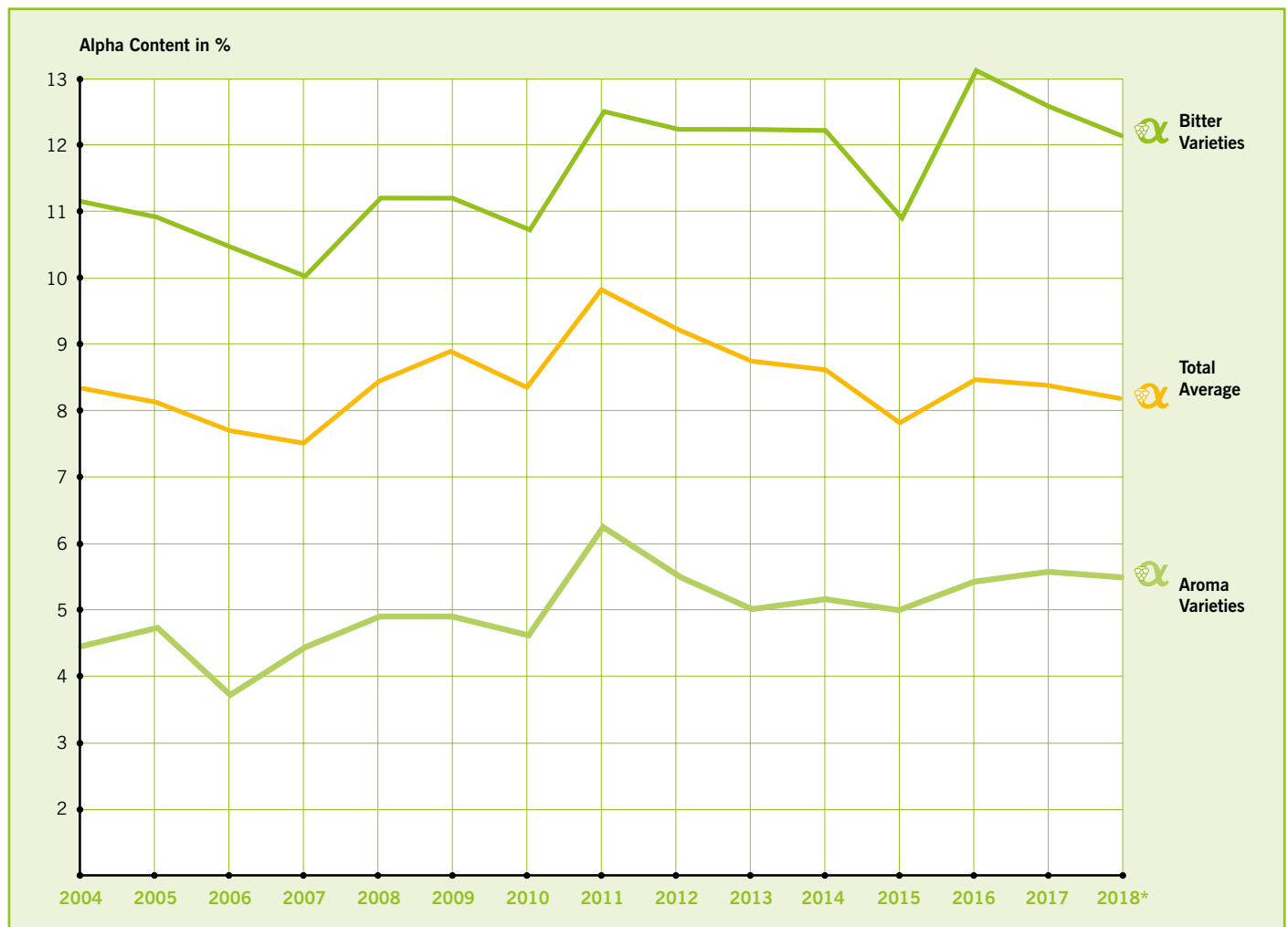
	Hops total		Pellets total		Extract total	
	(mt)		(mt)	(% total)	(mt)	(% total)
2005	93,448		61,582	65.9	28,595	30.6
2006	85,266		56,361	66.1	26,177	30.7
2007	91,418		59,513	65.1	29,345	32.1
2008	113,125		69,119	61.1	40,951	36.2
2009	111,386		65,161	58.5	43,997	39.5
2010	96,680		55,108	57.0	39,639	41.0
2011	97,376		54,531	56.0	41,482	42.6
2012	86,696		47,683	55.0	37,886	43.7
2013	82,631		50,653	61.3	31,069	37.6
2014	96,670		63,319	65.5	30,934	32.0
2015	87,358		63,160	72.3	22,189	25.4
2016	110,496		84,972	76.9	23,757	21.5
2017	117,718		88,312	75.0	28,017	23.8
2018*	116,227		86,008	74.0	29,057	25.0

World Alpha Acids Production 2015 – 2018

Total Crop Quantities in mt					% share			
	2015	2016	2017	2018*	2015	2016	2017	2018*
Aroma Varieties	45,361	67,232	72,305	68,342	51.9	60.8	58.6	58.8
Bitter Varieties	41,997	43,264	45,413	47,885	48.1	39.2	41.4	41.2
Total	87,358	110,496	117,718	116,227	100.0	100.0	100.0	100.0

Alpha Amount in kg					Alpha Content in %			
	2015	2016	2017	2018*	2015	2016	2017	2018*
Aroma Varieties	2,247,700	3,604,700	4,117,300	3,762,300	5.0	5.4	5.7	5.5
Bitter Varieties	4,589,900	5,768,700	5,783,500	5,784,900	10.9	13.3	12.7	12.1
Total	6,837,600	9,373,400	9,900,800	9,547,200	7.8	8.5	8.4	8.2

Alpha Values over time 2004– 2018



*Estimate

World Beer Production 2015 – 2018

	Beer Production in Mio hl				+/- %		
	2015	2016	2017	2018*	15/16	16/17	17/18*
Germany	95.7	95.3	93.0	93.5	- 0.4	- 2.4	+ 0.5
Russia	73.0	86.2	74.5	75.0	+ 18.1	- 13.6	+ 0.7
England	44.1	42.4	43.3	43.0	- 3.9	+ 2.1	- 0.7
Poland	39.8	41.5	40.5	41.0	+ 4.3	- 2.4	+ 1.2
Spain	34.8	36.3	37.2	37.8	+ 4.3	+ 2.5	+ 1.6
Netherlands	23.7	24.2	24.8	24.8	+ 2.1	+ 2.5	+ 0.0
Belgium	18.3	21.3	21.9	21.5	+ 16.4	+ 2.8	- 1.8
Czechia	20.1	20.6	20.3	20.5	+ 2.5	- 1.5	+ 1.0
France	20.5	21.3	21.3	21.5	+ 3.9	+ 0.0	+ 0.9
Ukraine	19.4	17.5	17.8	18.2	- 9.8	+ 1.7	+ 2.2
Romania	16.1	18.3	16.8	17.0	+ 13.7	- 8.2	+ 1.2
Italy	15.4	14.5	15.6	15.8	- 5.8	+ 7.6	+ 1.3
Austria	9.3	9.5	9.7	9.6	+ 2.2	+ 2.1	- 1.0
Turkey	9.0	9.5	9.1	9.0	+ 5.6	- 4.2	- 1.1
Ireland	7.3	7.9	7.8	8.0	+ 8.2	- 1.3	+ 2.6
Hungary	6.5	6.3	6.4	6.8	- 3.1	+ 1.6	+ 6.3
Denmark	6.1	6.4	6.3	6.5	+ 4.9	- 1.6	+ 3.2
Portugal	6.5	6.4	6.7	6.5	- 1.5	+ 4.7	- 3.0
Bulgaria	4.8	5.3	5.1	5.6	+ 10.4	- 3.8	+ 9.8
Sweden	4.7	4.2	4.6	4.8	- 10.6	+ 9.5	+ 4.3
Finland	4.0	3.8	4.0	4.3	- 5.0	+ 5.3	+ 7.5
Greece	3.7	3.8	3.8	3.8	+ 2.7	+ 0.0	+ 0.0
Switzerland	3.4	3.7	3.5	3.8	+ 8.8	- 5.4	+ 8.6
Croatia	3.4	3.6	3.5	3.5	+ 5.9	- 2.8	+ 0.0
Slovakia	2.4	3.2	2.9	3.1	+ 33.3	- 9.4	+ 6.9
Lithuania	3.2	2.9	2.9	3.0	- 9.4	+ 0.0	+ 3.4
Norway	2.5	2.6	2.6	2.7	+ 4.0	+ 0.0	+ 3.8
Slovenia	2.0	2.0	1.6	2.0	+ 0.0	- 20.0	+ 25.0
Estonia	1.4	1.5	1.4	1.5	+ 7.1	- 6.7	+ 7.1
Latvia	0.9	1.5	0.8	1.0	+ 66.7	- 46.7	+ 25.0
Albania	0.6	0.6	0.6	0.7	+ 0.0	+ 0.0	+ 16.7
Cyprus	0.3	0.4	0.4	0.4	+ 33.3	+ 0.0	+ 0.0
Luxembourg	0.3	0.4	0.3	0.3	+ 33.3	- 25.0	+ 0.0
Malta	0.2	0.1	0.2	0.2	- 50.0	+ 100.0	+ 0.0
Europe rest	13.2	13.1	19.0	15.8	- 0.8	+ 45.0	- 16.8
Europe total	516.6	538.1	530.2	532.5	+ 4.2	- 1.5	+ 0.4
USA	225.0	200.6	217.8	215.0	- 10.8	+ 8.6	- 1.3
Brazil	138.0	127.2	140.0	140.0	- 7.8	+ 10.1	+ 0.0
Mexico	90.0	109.8	110.0	111.0	+ 22.0	+ 0.2	+ 0.9
Colombia	22.7	22.8	21.9	22.9	+ 0.4	- 3.9	+ 4.6
Canada	22.7	20.8	22.1	20.4	- 8.4	+ 6.3	- 7.7
Argentina	18.1	18.3	18.9	18.7	+ 1.1	+ 3.3	- 1.1
Peru	13.7	13.9	14.4	14.7	+ 1.5	+ 3.6	+ 2.1
Chile	6.5	6.8	8.4	7.1	+ 4.6	+ 23.5	- 15.5
Venezuela	21.0	12.9	7.2	6.8	- 38.6	- 44.2	- 5.6
Equador	7.0	5.9	6.0	5.3	- 15.7	+ 1.7	- 11.7
Dominican Rep.	3.8	4.6	4.0	5.0	+ 21.1	- 13.0	+ 25.0
Bolivia	3.7	4.2	3.8	4.2	+ 13.5	- 9.5	+ 10.5
Panama	2.8	2.6	3.4	3.4	- 7.1	+ 30.8	+ 0.0
Cuba	2.8	3.3	2.6	3.1	+ 17.9	- 21.2	+ 19.2
Paraguay	1.5	2.1	3.0	3.0	+ 40.0	+ 42.9	+ 0.0
Guatemala	1.9	2.2	1.5	2.2	+ 15.8	- 31.8	+ 46.7
Costa Rica	1.7	1.8	1.7	1.9	+ 5.9	- 5.6	+ 11.8
Nicaragua	1.1	1.3	1.6	1.4	+ 18.2	+ 23.1	- 12.5
El Salvador	1.0	1.1	1.2	1.3	+ 10.0	+ 9.1	+ 8.3
Jamaica	1.1	1.1	1.0	1.1	+ 0.0	- 9.1	+ 10.0
Trinidad	0.4	1.0	0.4	1.1	+ 150.0	- 60.0	+ 175.0



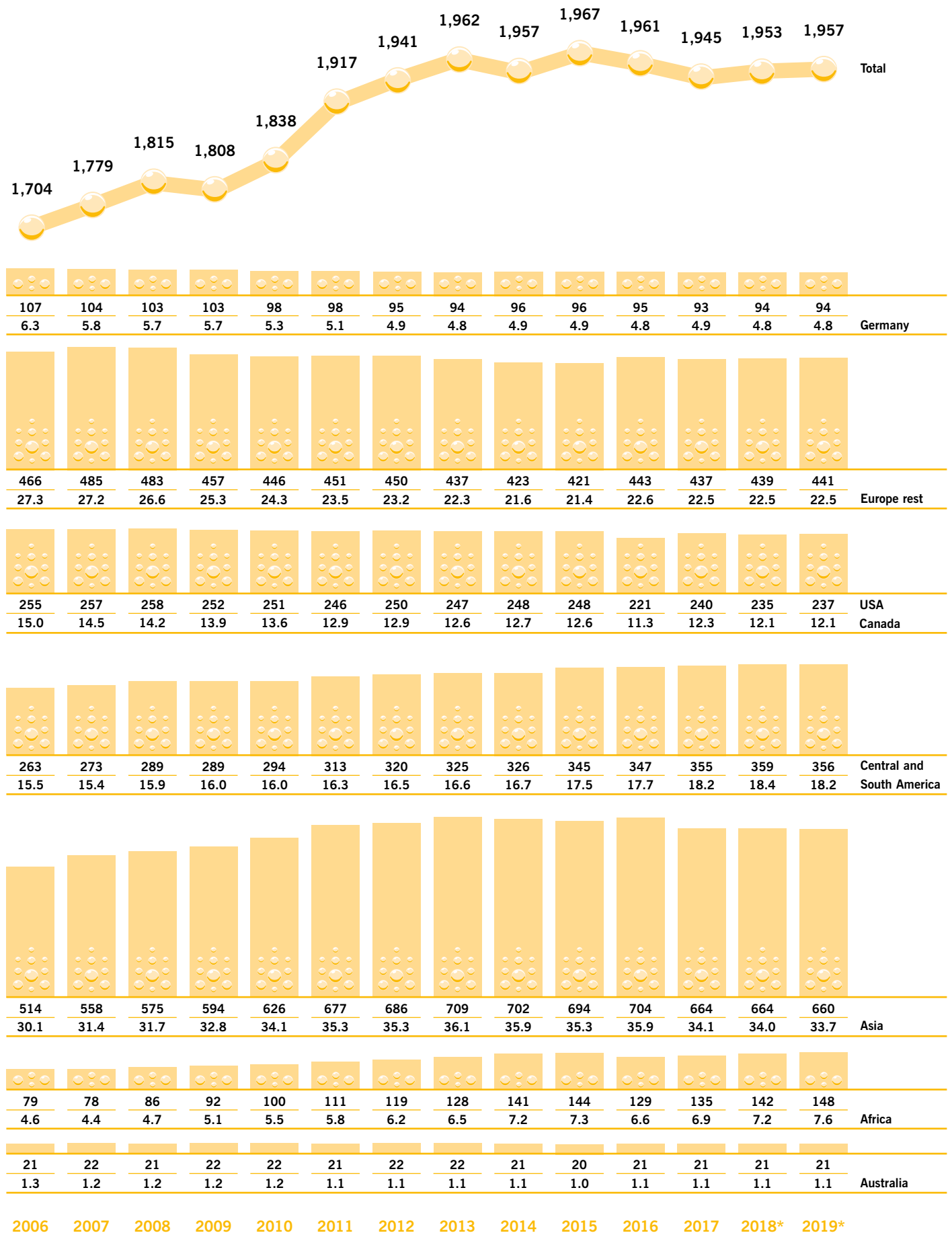
*Estimate

	Beer Production in Mio hl				+/- %		
	2015	2016	2017	2018*	15/16	16/17	17/18*
→ Honduras	1.6	1.3	1.1	1.0	- 18.8	- 15.4	- 9.1
Uruguay	1.0	0.9	1.0	0.9	- 10.0	+ 11.1	- 10.0
Puerto Rico	0.9	0.8	0.8	0.7	- 11.1	+ 0.0	- 12.5
America rest	2.4	1.5	1.0	1.7	- 37.5	- 33.3	+ 70.0
America total	592.4	568.8	594.8	593.9	- 4.0	+ 4.6	- 0.2
P.R.China	471.6	485.1	440.0	435.0	+ 2.9	- 9.3	- 1.1
Japan	53.8	54.3	51.6	53.5	+ 0.9	- 5.0	+ 3.7
Vietnam	39.3	40.6	46.1	46.3	+ 3.3	+ 13.5	+ 0.4
India	20.5	27.4	22.5	23.0	+ 33.7	- 17.9	+ 2.2
Thailand	25.5	21.8	22.0	22.8	- 14.5	+ 0.9	+ 3.6
South Korea	18.8	20.6	21.3	21.1	+ 9.6	+ 3.4	- 0.9
Philippines	17.2	17.7	19.7	20.1	+ 2.9	+ 11.3	+ 2.0
Cambodscha	8.9	6.3	6.9	7.4	- 29.2	+ 9.5	+ 7.2
Taiwan	5.4	3.9	5.6	5.6	- 27.8	+ 43.6	+ 0.0
Myanmar	4.5	3.3	4.0	4.0	- 26.7	+ 21.2	+ 0.0
Laos	4.2	3.3	4.4	3.8	- 21.4	+ 33.3	- 13.6
Malaysia	2.8	2.2	2.6	2.3	- 21.4	+ 18.2	- 11.5
Indonesia	2.0	2.1	2.0	2.2	+ 5.0	- 4.8	+ 10.0
Sri Lanka	1.2	1.5	1.4	1.5	+ 25.0	- 6.7	+ 7.1
Singapore	1.4	1.4	1.5	1.5	+ 0.0	+ 7.1	+ 0.0
Israel	1.3	1.3	1.3	1.3	+ 0.0	+ 0.0	+ 0.0
Mongolia	0.9	1.1	0.6	1.2	+ 22.2	- 45.5	+ 100.0
Nepal	0.7	0.8	1.1	0.9	+ 14.3	+ 37.5	- 18.2
Lebanon	0.3	0.2	0.3	0.2	- 33.3	+ 50.0	- 33.3
Jordan	0.1	0.1	0.1	0.1	+ 0.0	+ 0.0	+ 0.0
Pakistan	0.1	0.1	0.1	0.1	+ 0.0	+ 0.0	+ 0.0
Asia rest	13.1	8.8	9.0	9.6	- 32.8	+ 2.3	+ 6.7
Asia total	693.5	703.9	664.1	663.5	+ 1.5	- 5.7	- 0.1
South Africa	32.1	31.6	32.3	32.6	- 1.6	+ 2.2	+ 0.9
Nigeria	27.0	15.6	17.0	17.4	- 42.2	+ 9.0	+ 2.4
Ethiopia	6.8	9.9	11.8	13.0	+ 45.6	+ 19.2	+ 10.2
Angola	11.0	8.9	8.5	9.0	- 19.1	- 4.5	+ 5.9
Cameroon	7.6	6.5	6.6	6.0	- 14.5	+ 1.5	- 9.1
Kenya	4.7	4.9	5.5	5.2	+ 4.3	+ 12.2	- 5.5
Tanzania	4.3	4.6	4.5	5.0	+ 7.0	- 2.2	+ 11.1
Zaire	4.5	4.8	4.6	3.6	+ 6.7	- 4.2	- 21.7
Uganda	3.3	3.5	3.4	3.6	+ 6.1	- 2.9	+ 5.9
Mosambique	2.7	3.1	3.1	3.6	+ 14.8	+ 0.0	+ 16.1
Ivory Coast	2.7	2.5	3.0	3.0	- 7.4	+ 20.0	+ 0.0
Namibia	2.5	2.7	2.7	3.0	+ 8.0	+ 0.0	+ 11.1
Zimbabwe	2.3	2.3	2.3	2.3	+ 0.0	+ 0.0	+ 0.0
Tunisia	1.7	1.8	1.9	2.0	+ 5.9	+ 5.6	+ 5.3
Zambia	3.7	1.7	1.7	1.9	- 54.1	+ 0.0	+ 11.8
Ghana	2.7	1.6	1.8	1.9	- 40.7	+ 12.5	+ 5.6
Algeria	1.6	1.5	1.6	1.6	- 6.3	+ 6.7	+ 0.0
Madagascar	1.3	1.4	1.5	1.6	7.7	+ 7.1	+ 6.7
Egypt	1.0	1.2	1.0	1.3	+ 20.0	- 16.7	+ 30.0
Marocco	0.8	0.8	0.8	0.8	+ 0.0	+ 0.0	+ 0.0
Mauritius	0.3	0.4	0.4	0.4	+ 33.3	+ 0.0	+ 0.0
Africa rest	19.5	17.5	19.0	23.3	- 10.3	+ 8.6	+ 22.6
Africa total	144.1	128.8	135.0	142.1	- 10.6	+ 4.8	+ 5.3
Australia	16.2	16.7	16.3	16.6	+ 3.1	- 2.4	+ 1.8
New Zealand	2.8	2.8	2.9	2.9	+ 0.0	+ 3.6	+ 0.0
Oceania	1.4	1.3	1.5	1.3	- 7.1	+ 15.4	- 13.3
Australia total	20.4	20.9	20.7	20.8	+ 2.5	- 1.0	+ 0.5
World total	1,967.1	1,960.5	1,944.8	1,952.8	- 0.3	- 0.8	+ 0.4

*Estimate

World Beer Production 2006–2019

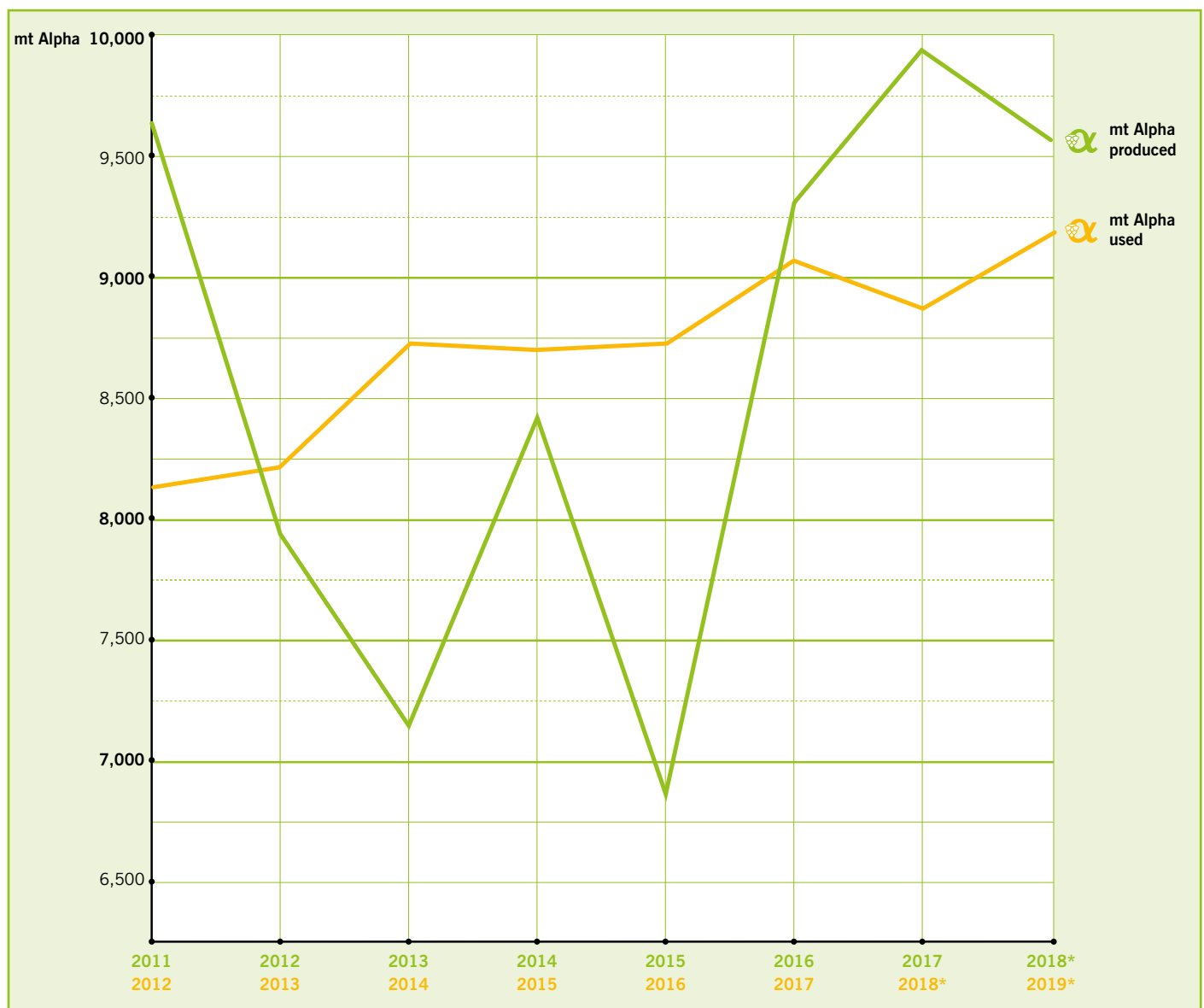
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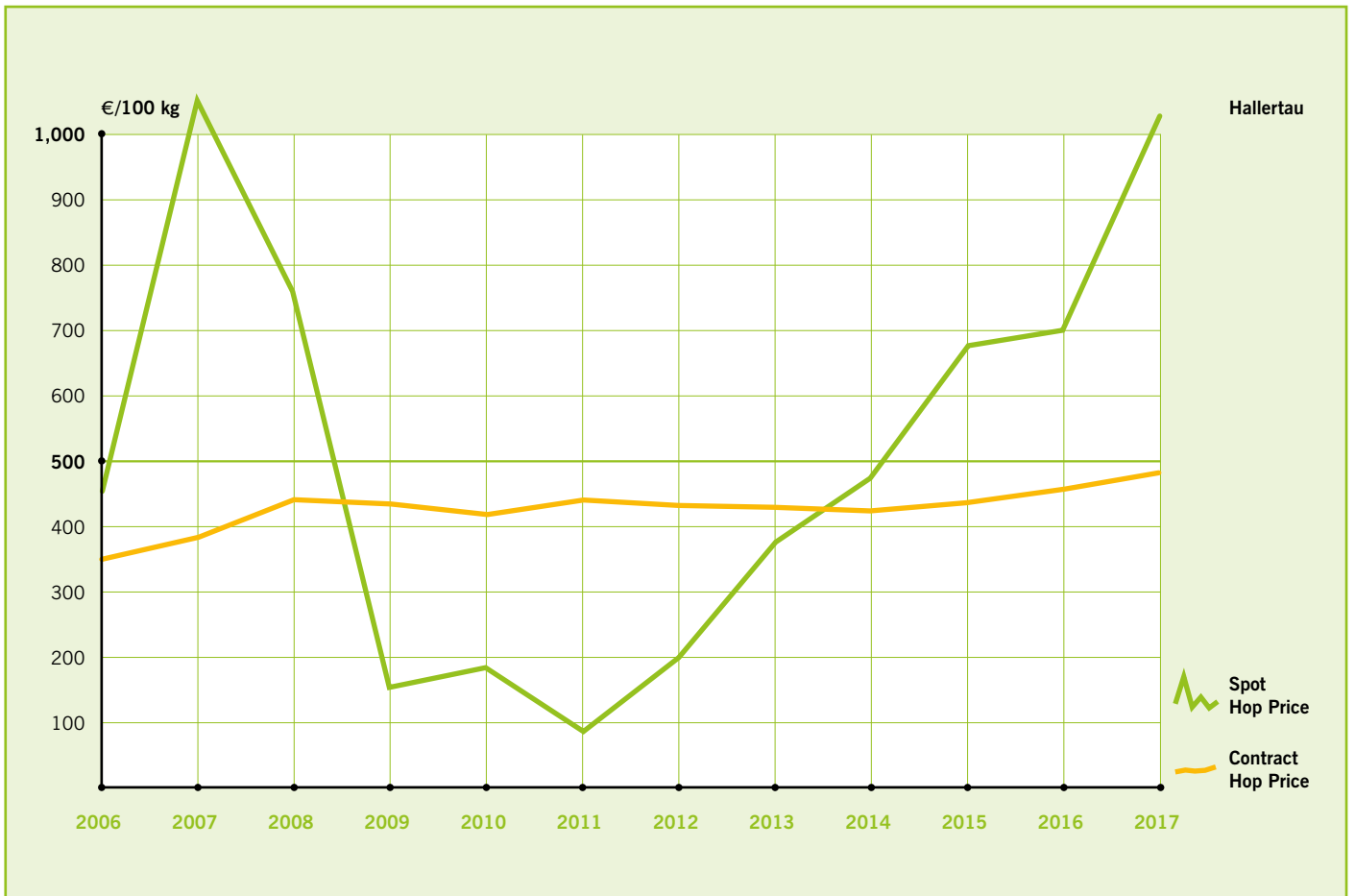
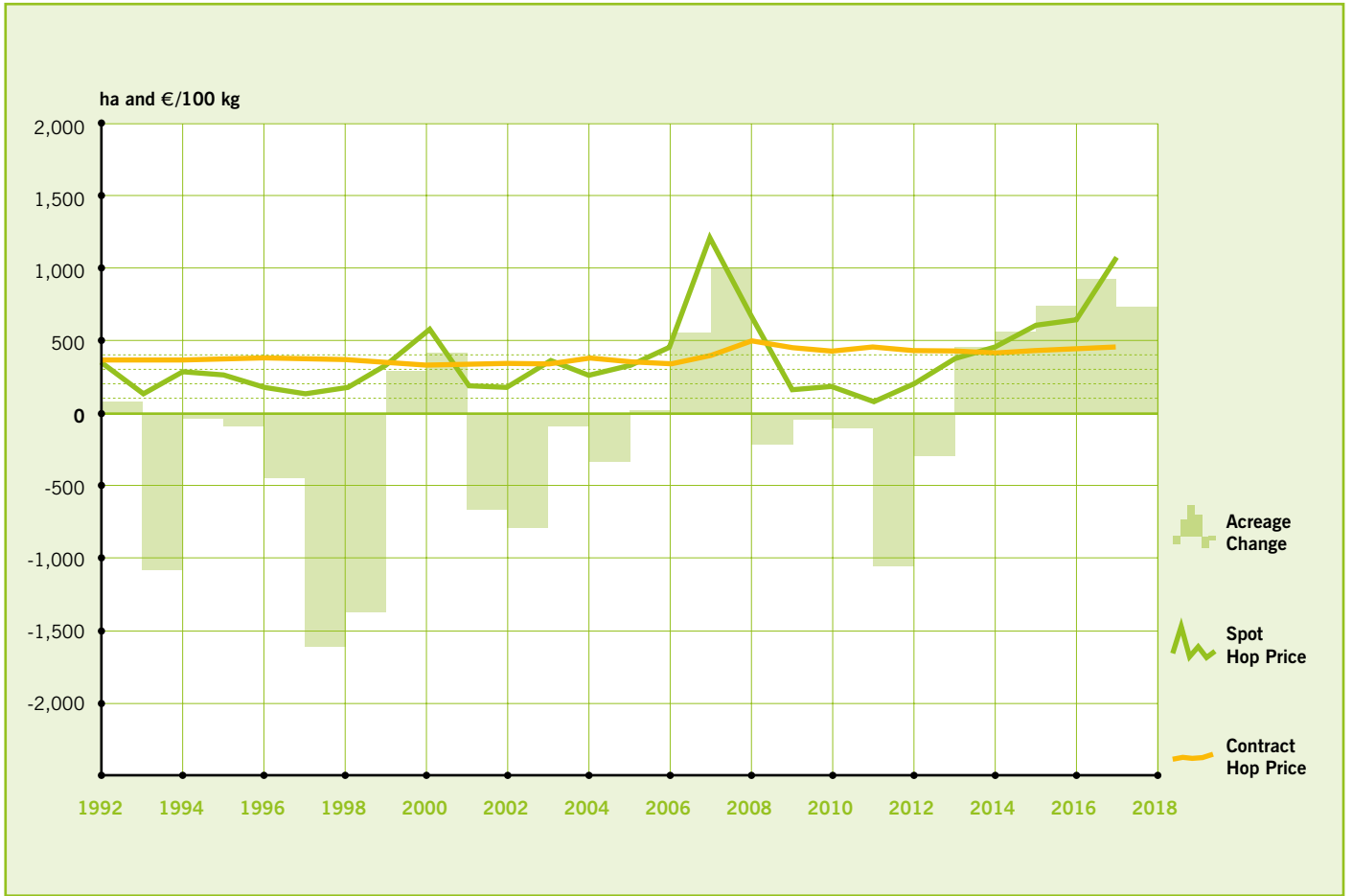
*Estimate

World Hop Acid Supply and Demand 2011 – 2018

	Production (mt Alpha)	Beer Production (Mio hl)	Alpha Dosage (g Alpha/hl)	Alpha Usage (mt Alpha)	Annual Balance (mt Alpha)	
2011	9,560	2012	1,941	4.2	8,152	1,408
2012	7,955	2013	1,962	4.2	8,240	-285
2013	7,211	2014	1,957	4.4	8,611	-1,400
2014	8,350	2015	1,967	4.5	8,852	-502
2015	6,838	2016	1,961	4.5	8,825	-1,987
2016	9,373	2017	1,945	4.6	8,947	426
2017	9,901	2018*	1,953	4.6	8,984	917
2018*	9,547	2019*	1,957	4.7	9,198	349



*Estimate



Hop Market Review and Outlook

Looking back

While most European growing areas had normal growing conditions in 2017, the Hallertau experienced hot and dry weather in July. Fortunately, rainfall in August provided an unexpected boost to late maturing varieties in the Hallertau, resulting in a crop comparable to the long term average. Only for early maturing aroma varieties, the rain was too late, resulting in below average yields and alpha acid concentrations. The crop results in the Czech Republic, Slovenia, the UK as well as other European growing regions were within the long term average. Only Spain had a dramatically reduced crop due to late frost in spring and a hail storm just prior to harvest.

Crop 2017 differed quite substantially amongst German growing areas. Southern Germany was particularly affected by hot and dry weather in July which led to very pessimistic expectations for the Hallertau crop. Growing conditions were more normal in the rest of Germany and Europe as a whole. Fortunately, there was sufficient and unexpected rainfall in August to help put later-harvested varieties back onto a more normal growth cycle, which led to yields nearly reaching long-term averages. Unfortunately the rain came too late for earlier-harvested aroma varieties and their yields and alpha levels were below long-term averages.

The crop results in England, the Czech Republic, Slovenia, and other European areas met long-term averages. Unfortunately, Spain's crop was dramatically reduced by both late frost and hail damage.

The crop in USA was above average despite a large amount of baby acres and a very hot summer. This once again illustrates the ability of US varieties to manage heat. Clearly the ample supply of irrigation water is imperative to having a consistent crop result. Recent winters have provided good snowpack to stock reservoirs for the coming growing seasons. Nearly all Washington and Idaho hop acres utilize drip irrigation to efficiently manage the water supply and effectively introduce nutrients to the crop.

Crop 2017's average alpha content of 8.4% was just below the 8.5% of crop 2016. The world crop of approximately 117,718 tons, or 9,901 tons of alpha acids compared to an estimated alpha demand of 8,984 tons for brewing year 2018. This slight oversupply is calculated based upon a small increase of world beer production to 1,953 million hectoliters. While there was an overproduction on aroma varieties the supply of bitter hops was very tight. The market reacted to these production numbers and supply needs were met by the ability of many brewers to use alpha from non-traditional varieties to fill their bittering requirements.

Looking forward

All major hop growing countries increased acreage in 2018. Worldwide acreage increased 2.6% for crop 2018 to 60,672 hectares, which was actually the smallest increase in recent years and half of the gain from crop 2017. This slowdown is reflective of production having caught up with demand since the last "paper shortage" after crop 2015.

Growing conditions in Europe were extremely challenging in 2018. German and Czech growers faced early season temperatures well above long term averages that led to early bloom for aroma varieties like Saaz and Mittlefrueher but also the normal stable variety Magnum. In July and August conditions in Europe were dry and expectations for the crop were mostly positive aside from the early bloom problem.



Nevertheless, a high level of disease and pest infestation, mainly powdery mildew and red spider mites, required increased plant protection applications. The hot and dry conditions in August, with temperatures well above normal, adversely affected the hop yield and alpha acid values. The only exception was Slovenia, which had sufficient precipitation.

We currently estimate that the 2018 German crop will be approximately 41,800 tons and the total European crop should land at 57,600 tons. This reflects a 4% decline from 2017 and means that several varieties will be in short supply because of significant yield and alpha reductions.

In USA the crop came in normal to above normal for both tonnage and alpha, except for the variety Centennial, which has always had its ups and downs. The crop is expected to come in at 48,700 MT, just slightly larger than 2017.

In total we expect the 2018 crop to be 116,227 tons, a 1.3% reduction from 2017 despite more acres. The average alpha acid content will be approximately 8.2%, also a decrease from 2017. Current data and estimates have beer production increasing slightly for both 2018 and 2019 to 1,957 million hectoliters. This corresponds to an alpha demand of 9,200 tons of alpha for brewing year 2019. Based upon a 2018 production of 9,547 tons of alpha, supply is adequate to meet demand without having to reach into inventories. It should be noted that, without variety specifics, official reports indicate adequate stocks of past crops on hand in USA. Further study makes it clear, however, that there are unique markets for specific varieties or groups of varieties. Although supply is theoretically short for the overall bitter market, solutions will be found to ensure that real demand is met.

The main challenge for the hop industry is to be able to grow and supply both aroma and bitter hops that are stable in yield and alpha year in and year out. Our private breeding program continues to bring advancements to the range of varieties so that consistent production will become the norm. Regardless of the variety, there has to be an adequate, irrigated water supply. In Europe this will require coordinated efforts by all industry participants to convince governments to allow for a much more universal implementation of irrigation systems.


Hopsteiner®

COMMITTED TO THE BREWER.



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