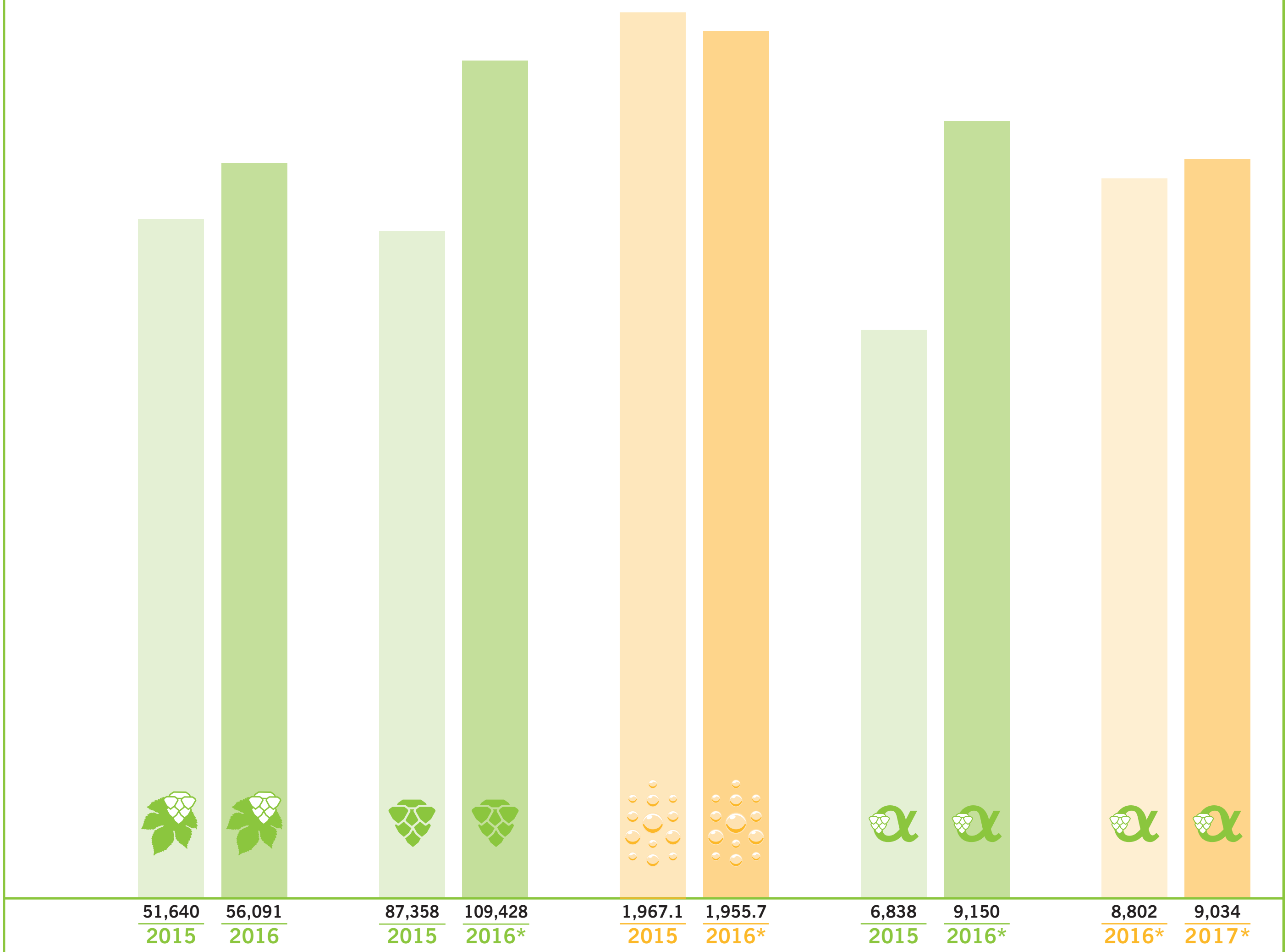
2016
GUIDELINES
FOR HOP BUYING

Hopsteiner®

COMMITTED TO THE BREWER.

	World Hop Acreage	World Hop Crop	World Beer Production	World Alpha Acids Production	World Alpha Acids Demand
	(ha)	(mt)	(Mio. hl)	(mt)	(mt)
2014	48,029	96,670	1,957.0	8,350	8,611
	+ 3.8 %	+ 17.0 %	- 0.2 %	+ 15.8 %	+ 4.5 %
2015	51,640	87,358	1,967.1	6,838	8,852
	+ 7.5 %	- 9.6 %	+ 0.5 %	- 18.1 %	+ 2.8 %
2016	56,091	109,428*	1,955,7*	9,150*	8,802*
	+ 8.6 %	+ 25.3 %*	- 0.6 %*	+ 33.8 %*	- 0.6 %*
2017	–	–	1,964.0*	–	9,034*
	–	–	+ 0.4 %*	–	+ 2.6 %*



*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

"Crop 2015 was a challenge for all participants. The crop was hampered by adverse weather that led to lower yields and below-average alpha levels.

Crop 2016 represents more of a return to normalcy both on the volume and quality fronts. In the year since the previous edition of Guidelines for Hop Buying craft beer segment has continued its upward sales trajectory and outsize influence on the hop market. The world alpha balance and average alpha dosing calculations that we work with have been adjusted to reflect this continuing trend.

The following report uses the most current data available to analyze the effect of the current crop on the market and alpha balance. We hope that the information presented is helpful in your hop buying decisions. Please contact your Hopsteiner representative anytime for further discussion. We will keep you posted during the year with additional market developments."

October 2016
S. S. Steiner, Inc.
Simon H. Steiner, Hopfen, GmbH
Steiner Hops Limited

- *Hallertauer Hopfenveredelungs-gesellschaft mbH Au, Hallertau, Pelletwerk*
- *Hallertauer Hopfenveredelungs-gesellschaft mbH Mainburg, Hallertau, Ethanol- und CO_2-Extraktion*
- *Hops Extract Corporation of America, Yakima, Washington, CO_2-Extraktion*
- *Golden Gate Hop Ranches Inc. Yakima, Washington, Hopfenanbaubetrieb*

Hop Acreage 2013 – 2016

	Acreage in ha				+/- %		
	2013	2014	2015	2016	13/14	14/15	15/16
Hallertauer	687	623	557	553	- 9.3	- 10.6	- 0.7
Hersbrucker	843	919	950	934	+ 9.0	+ 3.4	- 1.7
Perle	2,813	2,857	2,868	2,780	+ 1.6	+ 0.4	- 3.1
Spalter Select	408	434	443	440	+ 6.4	+ 2.1	- 0.7
Tradition	2,537	2,696	2,790	2,704	+ 6.3	+ 3.5	- 3.1
Saphir	308	360	387	400	+ 16.9	+ 7.5	+ 3.4
Northern Brewer	184	173	150	157	- 6.0	- 13.3	+ 4.7
Magnum	2,360	1,934	1,671	1,527	- 18.1	- 13.6	- 8.6
Nugget	156	145	137	129	- 7.1	- 5.5	- 5.8
Taurus	682	564	440	340	- 17.3	- 22.0	- 22.7
Herkules	2,869	3,345	3,836	4,540	+ 16.6	+ 14.7	+ 18.4
Rest	238	417	681	1,009	+ 75.2	+ 63.3	+ 48.2
Hallertau	**14,086**	**14,467**	**14,910**	**15,510**	**+ 2.7**	**+ 3.1**	**+ 4.0**
Elbe-Saale	1,186	1,265	1,325	1,409	+ 6.7	+ 4.7	+ 6.3
Tettnang	1,208	1,209	1,237	1,282	+ 0.1	+ 2.3	+ 3.6
Spalt	350	348	355	376	- 0.6	+ 2.0	+ 5.9
Rest	20	19	20	22	- 5.0	+ 5.3	+ 10.0
Germany total	**16,849**	**17,308**	**17,847**	**18,598**	**+ 2.7**	**+ 3.1**	**+ 4.2**
Austria	246	247	249	248	+ 0.4	+ 0.8	- 0.4
Belgium	158	148	148	155	- 6.3	+ 0.0	+ 4.7
Bulgaria	105	14	14	18	- 86.7	+ 0.0	+ 28.6
Czech Rep.	4,319	4,460	4,622	4,783	+ 3.3	+ 3.6	+ 3.5
England	982	1,051	895	928	+ 7.0	- 14.8	+ 3.7
France	381	431	440	453	+ 13.1	+ 2.1	+ 3.0
Poland	1,357	1,410	1,424	1,524	+ 3.9	+ 1.0	+ 7.0
Romania	250	250	270	282	+ 0.0	+ 8.0	+ 4.4
Russia	158	158	218	218	+ 0.0	+ 38.0	+ 0.0
Slovakia	174	137	137	137	- 21.3	+ 0.0	+ 0.0
Slovenia	1,165	1,296	1,403	1,528	+ 11.2	+ 8.3	+ 8.9
Spain	485	520	534	534	+ 7.2	+ 2.7	+ 0.0
Turkey	350	350	350	350	+ 0.0	+ 0.0	+ 0.0
Ukraine	469	362	369	369	- 22.8	+ 1.9	+ 0.0
Rest	195	195	194	194	+ 0.0	- 0.5	+ 0.0
Europe total	**27,643**	**28,337**	**29,114**	**30,319**	**+ 2.5**	**+ 2.7**	**+ 4.1**
Apollo	404	399	402	301	- 1.2	+ 0.8	- 25.1
Bravo	241	287	297	219	+ 19.1	+ 3.5	- 26.3
Cascade	2,140	2,679	2,748	2,983	+ 25.2	+ 2.6	+ 8.6
Centennial	880	1,357	1,888	2,027	+ 54.2	+ 39.1	+ 7.4
Chinook	704	664	723	996	- 5.7	+ 8.9	+ 37.8
Col. / Tom. / Zeus	2,493	2,337	2,154	1,821	- 6.3	- 7.8	- 15.5
Nugget	834	659	682	648	- 21.0	+ 3.5	- 5.0
Summit	1,151	1,021	656	713	- 11.3	- 35.7	+ 8.7
Super Galena	491	361	213	180	- 26.5	- 41.0	- 15.5
Willamette	435	469	550	586	+ 7.8	+ 17.3	+ 6.5
Rest	4,481	5,151	7,848	10,959	+ 15.0	+ 52.4	+ 39.6
USA total	**14,254**	**15,384**	**18,161**	**21,433**	**+ 7.9**	**+ 18.1**	**+ 18.0**
Argentina	195	195	195	195	+ 0.0	+ 0.0	+ 0.0
Australia	449	408	488	488	- 9.1	+ 19.6	+ 0.0
Japan	179	154	154	154	- 14.0	+ 0.0	+ 0.0
New Zealand	378	370	388	412	- 2.1	+ 4.9	+ 6.2
P.R.China	2,638	2,701	2,574	2,508	+ 2.4	- 4.7	- 2.6
South Africa	492	420	402	402	- 14.6	- 4.3	+ 0.0
Rest	60	60	164	180	+ 0.0	+ 173.3	+ 9.8
World total	**46,288**	**48,029**	**51,640**	**56,091**	**+ 3.8**	**+ 7.5**	**+ 8.6**

Hop Acreage 2003 – 2016

(ha and % share)

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Total	53,459	51,103	50,428	49,721	51,550	58,495	57,202	50,966	48,248	46,592	46,288	48,029	51,640	56,091
Germany (ha)	17,563	17,477	17,167	17,170	17,671	18,695	18,472	18,386	18,228	17,124	16,849	17,308	17,847	18,598
Germany (%)	32.9	34.2	34.0	34.5	34.3	32.0	32.3	36.1	37.8	36.8	36.4	36.0	34.6	33.2
Czechia Slovakia (ha)	6,292	6,188	5,977	5,765	5,689	5,645	5,537	5,439	4,854	4,580	4,493	4,597	4,759	4,920
Czechia Slovakia (%)	11.8	12.1	11.9	11.6	11.0	9.7	9.7	10.7	10.1	9.8	9.7	9.6	9.2	8.8
Europe rest (ha)	10,447	10,041	9,539	9,037	9,009	9,457	8,554	7,637	6,967	6,680	6,301	6,432	6,508	6,801
Europe rest (%)	19.5	19.6	18.9	18.2	17.5	16.2	15.0	15.0	14.4	14.3	13.6	13.4	12.6	12.1
USA (ha)	11,602	11,227	11,924	11,884	12,510	16,551	16,077	12,662	12,054	12,923	14,254	15,384	18,161	21,433
USA (%)	21.7	22.0	23.6	23.9	24.3	28.3	28.1	24.8	25.0	27.7	30.8	32.0	35.2	38.2
P. R. China (ha)	5,670	4,196	3,987	4,245	4,995	6,459	6,710	5,028	4,390	3,529	2,638	2,701	2,574	2,508
P. R. China (%)	10.6	8.2	7.9	8.5	9.7	11.0	11.7	9.9	9.1	7.6	5.7	5.6	5.0	4.5

Crop Quantities and Average Yields 2013 – 2016

	Crop Quantities in mt				+/- %			Ø Yields in mt / ha			
	2013	2014	2015	2016*	13/14	14/15	15/16*	2013	2014	2015	2016*
Hallertauer	699.9	1,026.7	618.6	990.0	+ 46.7	- 39.7	+ 60.0	1.02	1.65	1.11	1.79
Hersbrucker	1,112.8	1,900.6	1,361.7	1,890.0	+ 70.8	- 28.4	+ 38.8	1.32	2.07	1.43	2.02
Perle	3,901.5	6,103.0	3,917.8	6,460.0	+ 56.4	- 35.8	+ 64.9	1.39	2.14	1.37	2.32
Spalter Select	638.5	957.2	625.8	985.0	+ 49.9	- 34.6	+ 57.4	1.56	2.21	1.41	2.24
Tradition	3,353.9	5,521.4	3,882.8	6,220.0	+ 64.6	- 29.7	+ 60.2	1.32	2.05	1.39	2.30
Saphir	359.7	734.3	541.6	875.0	+ 104.1	- 26.2	+ 61.6	1.17	2.04	1.40	2.19
Northern Brewer	208.0	349.7	180.2	305.0	+ 68.1	- 48.5	+ 69.3	1.13	2.02	1.20	1.94
Magnum	4,778.3	4,029.2	2,892.0	3,250.0	- 15.7	- 28.2	+ 12.4	2.02	2.08	1.73	2.13
Nugget	298.8	373.7	249.3	310.0	+ 25.1	- 33.3	+ 24.3	1.92	2.58	1.82	2.40
Taurus	1,088.7	1,253.7	685.4	755.0	+ 15.2	- 45.3	+ 10.2	1.60	2.22	1.56	2.22
Herkules	6,376.4	10,290.7	8,062.3	13,000.0	+ 61.4	- 21.7	+ 61.2	2.22	3.08	2.10	2.86
Others	261.2	632.9	856.6	1,710.0	+ 142.3	+ 35.3	+ 99.6	1.10	1.52	1.26	1.69
Hallertau	**23,077.7**	**33,173.1**	**23,874.1**	**36,750.0**	**+ 43.7**	**- 28.0**	**+ 53.9**	**1.64**	**2.29**	**1.60**	**2.37**
Elbe-Saale	2,508.6	2,567.9	2,355.3	2,880.0	+ 2.4	- 8.3	+ 22.3	2.12	2.03	1.78	2.04
Tettnang	1,429.7	2,022.4	1,694.9	2,200.0	+ 41.5	- 16.2	+ 29.8	1.18	1.67	1.37	1.72
Spalt	499.7	688.7	376.6	735.0	+ 37.8	- 45.3	+ 95.2	1.43	1.98	1.06	1.95
Rest	38.5	47.7	35.8	43.0	+ 23.9	- 24.9	+ 20.1	1.93	2.51	1.79	1.95
Germany total	**27,554.1**	**38,499.8**	**28,336.7**	**42,608.0**	**+ 39.7**	**- 26.4**	**+ 50.4**	**1.64**	**2.22**	**1.59**	**2.29**
Austria	410.0	491.0	298.0	450.0	+ 19.8	- 39.3	+ 51.0	1.67	1.99	1.20	1.81
Belgium	211.0	187.0	187.0	194.0	- 11.4	+ 0.0	+ 3.7	1.34	1.26	1.26	1.25
Bulgaria	180.0	30.0	26.0	38.0	- 83.3	- 13.3	+ 46.2	1.71	2.14	1.86	2.11
Czechia	5,329.8	6,202.0	4,842.6	6,000.0	+ 16.4	- 21.9	+ 23.9	1.23	1.39	1.05	1.25
England	1,235.0	1,455.0	1,357.0	1,450.0	+ 17.8	- 6.7	+ 6.9	1.26	1.38	1.52	1.56
France	612.0	636.0	555.0	750.0	+ 3.9	- 12.7	+ 35.1	1.61	1.48	1.26	1.66
Poland	2,079.0	2,072.3	2,242.0	2,557.0	- 0.3	+ 8.2	+ 14.0	1.53	1.47	1.57	1.68
Romania	181.0	172.0	195.0	196.0	- 5.0	+ 13.4	+ 0.5	0.72	0.69	0.72	0.70
Russia	162.0	162.0	162.0	162.0	+ 0.0	+ 0.0	+ 0.0	1.03	1.03	0.74	0.74
Slovakia	193.0	183.0	94.0	151.0	- 5.2	- 48.6	+ 60.6	1.11	1.34	0.69	1.10
Slovenia	1,297.0	2,318.8	1,677.6	2,550.0	+ 78.8	- 27.7	+ 52.0	1.11	1.79	1.20	1.67
Spain	854.0	933.0	1,115.0	1,050.0	+ 9.3	+ 19.5	- 5.8	1.76	1.79	2.09	1.97
Turkey	390.0	390.0	390.0	390.0	+ 0.0	+ 0.0	+ 0.0	1.11	1.11	1.11	1.11
Ukraine	520.0	436.0	480.0	480.0	- 16.2	+ 10.1	+ 0.0	1.11	1.20	1.30	1.30
Rest	302.0	294.7	296.0	311.5	- 2.4	+ 0.4	+ 5.2	1.55	1.51	1.53	1.61
Europe total	**41,509.9**	**54,462.6**	**42,253.9**	**59,337.5**	**+ 31.2**	**- 22.4**	**+ 40.4**	**1.50**	**1.92**	**1.45**	**1.96**
Apollo	1,222.0	1,100.1	1,146.8	740.5	- 10.0	+ 4.2	- 35.4	3.02	2.76	2.85	2.46
Bravo	806.0	880.7	926.4	712.5	+ 9.3	+ 5.2	- 23.1	3.34	3.07	3.12	3.25
Cascade	3,944.0	5,262.4	5,885.0	6,350.3	+ 33.4	+ 11.8	+ 7.9	1.84	1.96	2.14	2.13
Centennial	1,497.0	1,977.6	2,345.4	3,192.2	+ 32.1	+ 18.6	+ 36.1	1.70	1.46	1.24	1.57
Chinook	1,540.0	1,328.9	1,466.6	2,041.2	- 13.7	+ 10.4	+ 39.2	2.19	2.00	2.03	2.05
Col./Tom./Zeus	7,853.0	7,244.6	6,610.0	4,797.8	- 7.7	- 8.8	- 27.4	3.15	3.10	3.07	2.63
Nugget	1,898.0	1,413.4	1,399.6	1,451.5	- 25.5	- 1.0	+ 3.7	2.28	2.14	2.05	2.24
Summit	2,416.0	2,407.8	1,446.8	1,723.7	- 0.3	- 39.9	+ 19.1	2.10	2.36	2.21	2.42
Super Galena	1,461.0	993.1	612.9	544.3	- 32.0	- 38.3	- 11.2	2.98	2.75	2.88	3.02
Willamette	668.0	676.8	686.5	859.8	+ 1.3	+ 1.4	+ 25.2	1.54	1.44	1.25	1.47
Rest	8,149.0	8,918.0	13,238.2	19,617.9	+ 9.4	+ 48.4	+ 48.2	1.82	1.73	1.69	1.79
USA total	**31,454.0**	**32,203.4**	**35,764.2**	**42,031.7**	**+ 2.4**	**+ 11.1**	**+ 17.5**	**2.21**	**2.09**	**1.97**	**1.96**
Argentina	300.0	300.0	300.0	300.0	+ 0.0	+ 0.0	+ 0.0	1.54	1.54	1.54	1.54
Australia	1,146.0	1,079.0	1,200.5	1,105.0	- 5.8	+ 11.3	- 8.0	2.55	2.64	2.46	2.26
Japan	335.0	300.0	300.0	300.0	- 10.4	+ 0.0	+ 0.0	1.87	1.95	1.95	1.95
New Zealand	703.0	765.0	740.0	794.0	+ 8.8	- 3.3	+ 7.3	1.86	2.07	1.91	1.93
P.R.China	6,230.0	6,700.0	5,790.0	4,500.0	+ 7.5	- 13.6	- 22.3	2.36	2.48	2.25	1.79
South Africa	913.0	820.0	769.4	820.0	- 10.2	- 6.2	+ 6.6	1.86	1.95	1.91	2.04
Rest	40.0	40.0	240.0	240.0	+ 0.0	+ 500.0	+ 0.0	0.67	0.67	1.46	1.33
World total	**82,630.9**	**96,670.0**	**87,358.0**	**109,428.2**	**+ 17.0**	**- 9.6**	**+ 25.3**	**1.79**	**2.01**	**1.69**	**1.95**

*Estimate

World Hop Crop 2003 – 2016

(1.000 mt and % share)

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016*
Total	85.5	91.1	93.4	85.3	91.4	113.1	111.4	96.7	97.4	86.7	82.6	96.7	87.4	109.4
	25.4	33.2	34.5	28.5	32.1	39.7	31.3	34.2	38.1	34.5	27.6	38.5	28.3	42.6
Germany	29.6	36.4	36.9	33.4	35.2	35.1	28.1	35.4	39.1	39.8	33.3	39.8	32.4	38.9
Czechia	5.9	6.7	8.3	5.8	5.9	7.1	6.9	8.0	6.4	4.5	5.5	6.4	4.9	6.2
Slovakia	6.9	7.3	8.8	6.8	6.4	6.3	6.2	8.3	6.5	5.2	6.7	6.6	5.7	5.6
	12.1	13.9	13.8	11.4	11.5	12.6	11.2	11.2	10.0	8.9	8.4	9.6	9.0	10.6
Europe rest	14.2	15.3	14.8	13.3	12.6	11.1	10.1	11.5	10.3	10.3	10.3	9.9	10.3	9.7
	24.8	25.0	24.0	26.2	27.3	36.6	42.9	29.7	29.4	27.8	31.5	32.2	35.8	40,0
USA	28.9	27.5	25.7	30.7	29.9	32.3	38.6	30.7	30.2	32.0	38.1	33.3	40.9	38,4
	13.7	8.4	9.1	10.4	11.4	14.0	15.4	10.2	10.2	7.5	6.2	6.7	5.8	4.5
P. R. China	16.0	9.2	9.7	12.2	12.4	12.3	13.8	10.5	10.5	8.7	7.5	6.9	6.6	4.1

*Estimate

Hopsteiner Laboratory Values 2013 – 2016

Alpha Content in %				
Aroma Varieties	**2013**	**2014**	**2015**	**2016**
Hersbrucker	1.9	2.1	2.3	2.8
Perle	5.4	8.0	4.5	8.2
Tradition	5.0	5.8	4.7	6.4
Select	3.3	4.7	3.2	5.2
Tettnang	2.6	4.1	2.1	3.8
Spalt	2.8	3.4	2.2	4.3
Saaz	2.9	2.9	2.1	3.4
Steirer Aurora	6.1	10.2	8.5	8.7
Steirer Golding	2.2	5.1	3.2	3.2
US Cascade	6.8	5.8	6.6	6,1
US Willamette	5.0	5.0	5.2	4.8
Dual Purpose	**2013**	**2014**	**2015**	**2016**
US Centennial	10.3	9.8	9.9	10.0

Alpha Content in %				
Bitter Varieties	**2013**	**2014**	**2015**	**2016**
Northern Brewer	6.6	9.7	5.4	10.5
Herkules	16.5	17.5	15.1	17.3
Magnum	12.6	13.0	12.6	14.3
Taurus	15.9	17.4	12.9	17.6
US Super Galena	15.3	15.4	15.4	15.1
US Bravo	15.8	14.8	14.4	14.8
US Nugget	14.0	13.8	14.4	12.5
US Summit	17.0	16.8	16.2	16.5
US CTZ	15.8	15.9	15.6	14.2
Pride of Ringwood	9.1	8.9	9.0	9.4

Worldwide use of Hops and Hop Products 2003 – 2016

	Hops total	Pellets total		Extract total	
	(mt)	(mt)	(% total)	(mt)	(% total)
2003	85,520	49,600	58.0	28,000	32.7
2004	91,132	56,800	62.3	28,600	31.4
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*	109,428	82,071	75.0	24,074	22.0

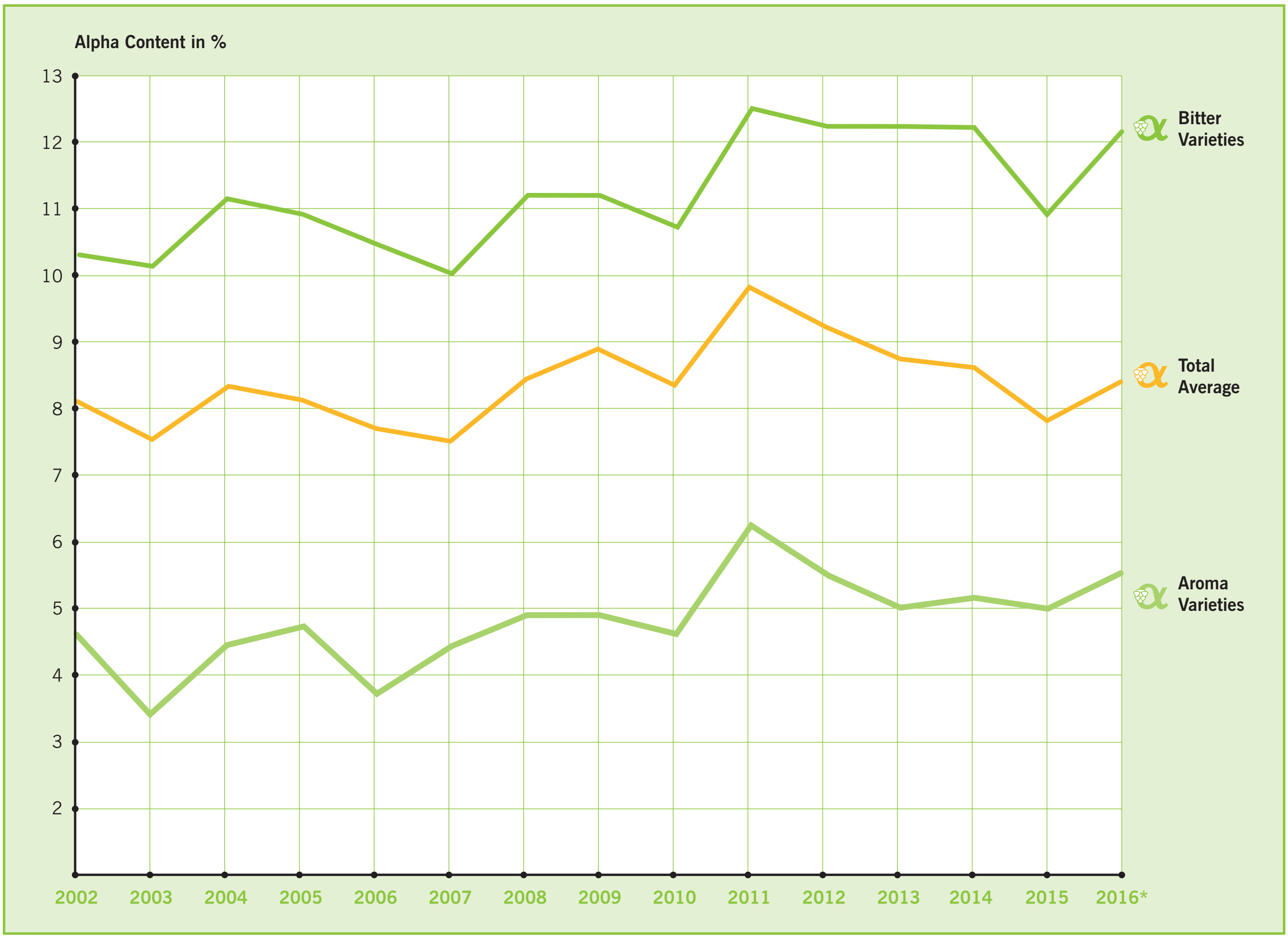
*Estimate

World Alpha Acids Production 2013 – 2016

	Total Crop Quantities in mt				% share			
	2013	2014	2015	2016*	2013	2014	2015	2016*
Aroma Varieties	39,373	48,529	45,361	62,851	47.6	50.2	51.9	57.4
Bitter Varieties	43,258	48,141	41,997	46,577	52.4	49.8	48.1	42.6
Total	**82,631**	**96,670**	**87,358**	**109,428**	**100.0**	**100.0**	**100.0**	**100.0**

	Alpha Amount in kg				Alpha Content in %			
	2013	2014	2015	2016*	2013	2014	2015	2016*
Aroma Varieties	1,959,300	2,465,900	2,247,700	3,513,300	5.0	5.1	5.0	5.6
Bitter Varieties	5,251,300	5,883,800	4,589,900	5,636,400	12.2	12.2	10.9	12.1
Total	**7,210,600**	**8,349,700**	**6,837,600**	**9,149,700**	**8.7**	**8.6**	**7.8**	**8.4**

Alpha Values over time 2002 – 2016



*Estimate

World Beer Production 2013 – 2016

	Beer Production in Mio hl				+/- %		
	2013	2014	2015	2016*	13/14	14/15	15/16*
Germany	94.4	95.6	95.7	96.0	+ 1.3	+ 0.1	+ 0.3
Russia	88.9	76.6	73.0	75.3	- 13.8	- 4.7	+ 3.2
England	42.4	41.2	44.1	44.3	- 2.8	+ 7.0	+ 0.5
Poland	39.6	39.2	39.8	39.9	- 1.0	+ 1.5	+ 0.3
Spain	33.1	33.5	34.8	36.2	+ 1.2	+ 3.9	+ 4.0
Netherlands	23.7	23.7	23.7	23.9	+ 0.0	+ 0.0	+ 0.8
France	18.7	18.8	20.5	21.5	+ 0.5	+ 9.0	+ 4.9
Czechia	18.6	19.7	20.1	20.1	+ 5.9	+ 2.0	+ 0.0
Ukraine	27.6	24.5	19.4	18.6	- 11.2	- 20.8	- 4.1
Belgium	18.1	18.0	18.3	18.6	- 0.6	+ 1.7	+ 1.6
Romania	16.6	16.5	16.1	15.9	- 0.6	- 2.4	- 1.2
Italy	12.7	13.0	15.4	15.6	+ 2.4	+ 18.5	+ 1.3
Austria	9.2	9.2	9.3	9.4	+ 0.0	+ 1.1	+ 1.1
Turkey	8.0	10.1	9.0	9.0	26.3	- 10.9	+ 0.0
Ireland	8.0	8.0	7.3	7.5	+ 0.0	- 8.8	+ 2.7
Hungary	6.0	6.2	6.5	6.6	+ 3.3	+ 4.8	+ 1.5
Portugal	7.9	7.4	6.5	6.5	- 6.3	- 12.2	+ 0.0
Denmark	6.1	6.1	6.1	6.0	+ 0.0	+ 0.0	- 1.6
Bulgaria	5.1	4.9	4.8	4.8	- 3.9	- 2.0	+ 0.0
Sweden	3.8	4.4	4.7	4.8	15.8	+ 6.8	+ 2.1
Finland	4.0	4.0	4.0	4.0	+ 0.0	+ 0.0	+ 0.0
Greece	3.7	3.7	3.7	3.7	+ 0.0	+ 0.0	+ 0.0
Switzerland	3.4	3.4	3.4	3.5	+ 0.0	+ 0.0	+ 2.9
Croatia	3.4	3.4	3.4	3.4	+ 0.0	+ 0.0	+ 0.0
Lithuania	2.9	3.1	3.2	3.3	+ 6.9	+ 3.2	+ 3.1
Norway	2.4	2.4	2.5	2.7	+ 0.0	+ 4.2	+ 8.0
Slovakia	3.2	2.9	2.4	2.6	- 9.4	- 17.2	+ 8.3
Slovenia	1.9	2.0	2.0	2.0	+ 5.3	+ 0.0	+ 0.0
Estonia	1.5	1.5	1.4	1.4	+ 0.0	- 6.7	+ 0.0
Latvia	1.5	1.0	0.9	1.0	- 33.3	- 10.0	+ 11.1
Albania	0.6	0.6	0.6	0.6	+ 0.0	+ 0.0	+ 0.0
Luxembourg	0.3	0.3	0.3	0.3	+ 0.0	+ 0.0	+ 0.0
Cyprus	0.3	0.2	0.3	0.3	- 33.3	+ 50.0	+ 0.0
Malta	0.1	0.1	0.2	0.1	+ 0.0	+ 100.0	- 50.0
Europe rest	13.4	13.6	13.2	13.4	+ 1.5	- 2.9	+ 1.5
Europe total	**531.1**	**518.8**	**516.6**	**522.8**	**- 2.3**	**- 0.4**	**+ 1.2**
USA	224.6	225.9	225.0	225.0	+ 0.6	- 0.4	+ 0.0
Brazil	134.2	134.5	138.0	131.1	+ 0.2	+ 2.6	- 5.0
Mexico	82.0	82.0	90.0	95.0	+ 0.0	+ 9.8	+ 5.6
Colombia	22.3	22.0	22.7	23.0	- 1.3	+ 3.2	+ 1.3
Canada	22.6	22.6	22.7	22.7	+ 0.0	+ 0.4	+ 0.0
Venezuela	22.2	22.4	21.0	19.0	+ 0.9	- 6.3	- 9.5
Argentina	16.8	16.3	18.1	18.0	- 3.0	+ 11.0	- 0.6
Peru	13.5	13.5	13.7	13.7	+ 0.0	+ 1.5	+ 0.0
Equador	6.0	6.0	7.0	7.0	+ 0.0	+ 16.7	+ 0.0
Chile	6.0	6.2	6.5	6.6	+ 3.3	+ 4.8	+ 1.5
Dominican Rep.	3.6	3.6	3.8	3.8	+ 0.0	+ 5.6	+ 0.0
Bolivia	1.4	1.4	3.7	3.7	+ 0.0	+ 164.3	+ 0.0
Cuba	2.8	2.8	2.8	2.8	+ 0.0	+ 0.0	+ 0.0
Panama	1.9	2.1	2.8	2.8	+ 10.5	+ 33.3	+ 0.0
Guatemala	1.5	1.6	1.9	2.0	+ 6.7	+ 18.8	+ 5.3
Costa Rica	1.7	1.7	1.7	1.8	+ 0.0	+ 0.0	+ 5.9
Paraguay	1.5	1.5	1.5	1.5	+ 0.0	+ 0.0	+ 0.0
Honduras	0.9	1.0	1.6	1.5	+ 11.1	+ 60.0	- 6.3
Nicaragua	1.0	1.0	1.1	1.2	+ 0.0	+ 10.0	+ 9.1
Jamaica	1.0	1.0	1.1	1.1	+ 0.0	+ 10.0	+ 0.0
El Salvador	1.0	1.1	1.0	1.0	+ 10.0	- 9.1	+ 0.0

→

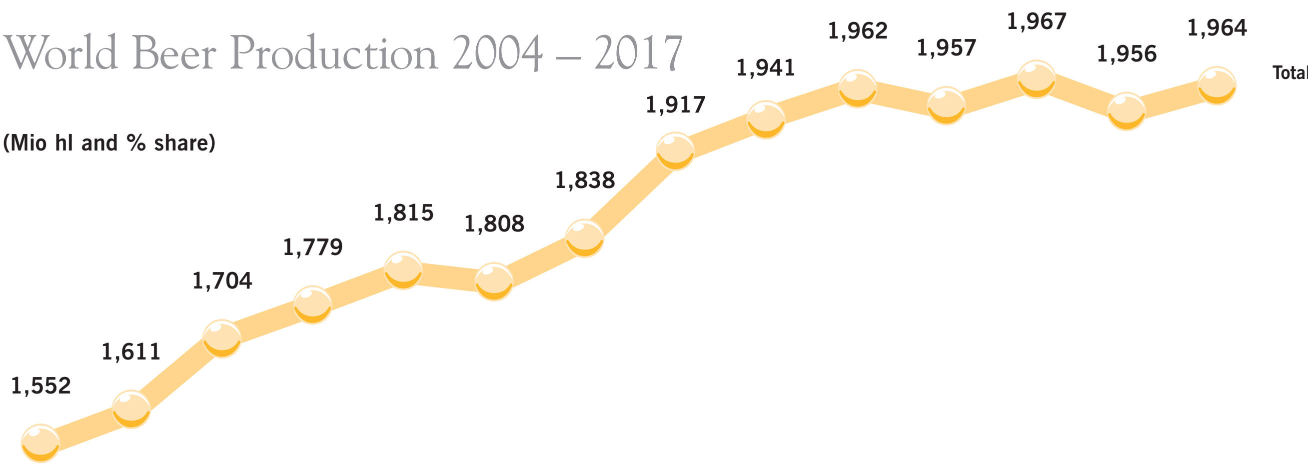
*Estimate

	Beer Production in Mio hl				+/- %		
	2013	2014	2015	2016*	13/14	14/15	15/16*
→ Uruguay	1.0	1.0	1.0	1.0	+ 0.0	+ 0.0	+ 0.0
Puerto Rico	0.7	0.7	0.9	0.9	+ 0.0	+ 28.6	+ 0.0
Trinidad	0.4	0.4	0.4	0.4	+ 0.0	+ 0.0	+ 0.0
America rest	1.6	1.8	2.4	2.7	+ 12.5	+ 33.3	+ 12.5
America total	**572.2**	**574.1**	**592.4**	**589.3**	**+ 0.3**	**+ 3.2**	**- 0.5**
P.R.China	506.0	493.0	471.6	451.3	- 2.6	- 4.3	- 4.3
Japan	57.2	53.9	53.8	53.8	- 5.8	- 0.2	+ 0.0
Vietnam	32.0	35.4	39.3	36.5	+ 10.6	+ 11.0	- 7.1
Thailand	21.0	22.4	25.5	26.5	+ 6.7	+ 13.8	+ 3.9
South Korea	19.4	20.8	18.8	19.0	+ 7.2	- 9.6	+ 1.1
India	20.0	20.0	20.5	20.7	+ 0.0	+ 2.5	+ 1.0
Philippines	16.2	17.0	17.2	17.3	+ 4.9	+ 1.2	+ 0.6
Cambodscha	4.1	4.8	8.9	10.9	+ 17.1	+ 85.4	+ 22.5
Taiwan	4.9	5.3	5.4	5.4	+ 8.2	+ 1.9	+ 0.0
Laos	3.6	4.0	4.2	4.3	+ 11.1	+ 5.0	+ 2.4
Myanmar	2.0	2.9	4.5	5.0	+ 45.0	+ 55.2	+ 11.1
Malaysia	2.4	2.6	2.8	3.0	+ 8.3	+ 7.7	+ 7.1
Indonesia	2.7	2.9	2.0	2.1	+ 7.4	- 31.0	+ 5.0
Singapore	1.2	1.2	1.4	1.5	+ 0.0	+ 16.7	+ 7.1
Israel	1.1	1.2	1.3	1.3	+ 9.1	+ 8.3	+ 0.0
Sri Lanka	0.9	1.0	1.2	1.2	+ 11.1	+ 20.0	+ 0.0
Mongolia	0.6	0.8	0.9	1.0	+ 33.3	+ 12.5	+ 11.1
Nepal	0.5	0.6	0.7	0.1	+ 20.0	+ 16.7	- 85.7
Lebanon	0.3	0.3	0.3	0.3	+ 0.0	+ 0.0	+ 0.0
Jordan	0.1	0.1	0.1	0.1	+ 11.1	+ 0.0	+ 0.0
Pakistan	0.1	0.1	0.1	0.1	+ 12.5	+ 11.1	+ 0.0
Asia rest	12.4	11.6	13.1	14.1	- 6.5	+ 12.9	+ 7.6
Asia total	**708.7**	**701.9**	**693.5**	**675.4**	**- 1.0**	**- 1.2**	**- 2.6**
South Africa	31.5	31.5	32.1	32.4	+ 0.0	+ 1.9	+ 0.9
Nigeria	25.0	27.0	27.0	27.1	+ 8.0	+ 0.0	+ 0.4
Angola	10.0	11.0	11.0	11.0	+ 10.0	+ 0.0	+ 0.0
Cameroon	6.5	7.8	7.6	7.7	+ 20.0	- 2.6	+ 1.3
Ethiopia	4.0	5.1	6.8	7.2	+ 27.5	+ 33.3	+ 5.9
Zaire	5.5	6.0	4.5	5.1	+ 9.1	- 25.0	+ 13.3
Kenya	5.3	5.1	4.7	4.9	- 3.8	- 7.8	+ 4.3
Tanzania	3.8	4.3	4.3	4.3	+ 13.2	+ 0.0	+ 0.0
Zambia	1.2	3.0	3.7	3.7	+ 150.0	+ 23.3	+ 0.0
Uganda	3.2	3.4	3.3	3.4	+ 6.3	- 2.9	+ 3.0
Mosamibque	3.0	3.1	2.7	2.9	+ 3.3	- 12.9	+ 7.4
Ghana	2.0	2.7	2.7	2.8	+ 35.0	+ 0.0	+ 3.7
Ivory Coast	1.9	2.3	2.3	2.7	+ 21.1	+ 0.0	+ 17.4
Namibia	2.5	2.5	2.5	2.6	+ 0.0	+ 0.0	+ 4.0
Zimbabwe	1.5	2.2	2.3	2.3	+ 46.7	+ 4.5	+ 0.0
Tunisia	1.9	2.0	1.7	1.8	+ 5.3	- 15.0	+ 5.9
Algeria	1.4	1.6	1.6	1.6	+ 14.3	+ 0.0	+ 0.0
Madagascar	1.1	1.2	1.3	1.3	+ 9.1	+ 8.3	+ 0.0
Egypt	1.0	1.0	1.0	1.1	+ 0.0	+ 0.0	+ 10.0
Marocco	0.8	0.8	0.8	0.8	+ 0.0	+ 0.0	+ 0.0
Mauritius	0.5	0.4	0.3	0.4	- 20.0	- 25.0	+ 33.3
Africa rest	14.3	17.1	19.9	20.5	+ 19.6	+ 16.4	+ 3.0
Africa total	**127.9**	**141.1**	**144.1**	**147.6**	**+ 10.3**	**+ 2.1**	**+ 2.4**
Australia	17.3	16.9	16.2	16.4	- 2.3	- 4.1	+ 1.2
New Zealand	2.9	2.8	2.8	2.9	- 3.4	+ 0.0	+ 3.6
Oceania	1.5	1.4	1.4	1.4	- 6.7	+ 0.0	+ 0.0
Australia total	**21.7**	**21.1**	**20.4**	**20.7**	**- 2.8**	**- 3.3**	**+ 1.5**
World total	**1.961.5**	**1.957.0**	**1.967.1**	**1.955.7**	**- 0.2**	**+ 0.5**	**- 0.6**

*Estimate

World Beer Production 2004 – 2017

(Mio hl and % share)

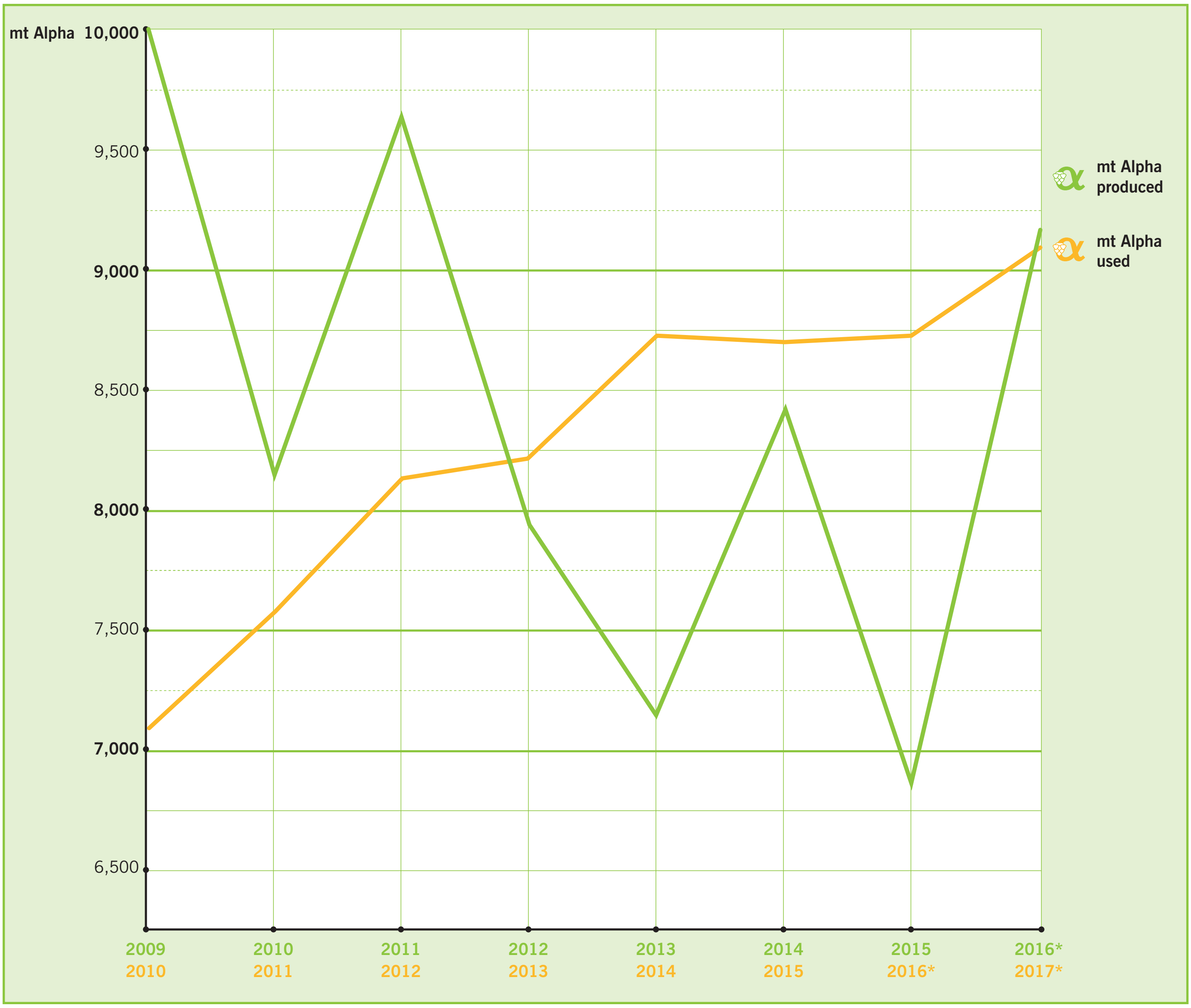


	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016*	2017*
Germany	106	105	107	104	103	103	98	98	95	94	96	96	96	96
	6.8	6.5	6.3	5.8	5.7	5.7	5.3	5.1	4.9	4.8	4.9	4.9	4.9	4.9
Europe rest	426	439	466	485	483	457	446	451	450	437	423	421	427	432
	27.4	27.3	27.3	27.2	26.6	25.3	24.3	23.5	23.2	22.3	21.6	21.4	21.8	22.0
USA Canada	258	254	255	257	258	252	251	246	250	247	248	248	248	248
	16.6	15.8	15.0	14.5	14.2	13.9	13.6	12.9	12.9	12.6	12.7	12.6	12.7	12.6
Central and South America	226	243	263	273	289	289	294	313	320	325	326	345	342	342
	14.6	15.1	15.5	15.4	15.9	16.0	16.0	16.3	16.5	16.6	16.7	17.5	17.5	17.4
Asia	449	475	514	558	575	594	626	677	686	709	702	694	675	675
	28.9	29.5	30.1	31.4	31.7	32.8	34.1	35.3	35.3	36.1	35.9	35.3	34.5	34.4
Africa	67	73	79	78	86	92	100	111	119	128	141	144	148	150
	4.3	4.5	4.6	4.4	4.7	5.1	5.5	5.8	6.2	6.5	7.2	7.3	7.5	7.6
Australia	21	21	21	22	21	22	22	21	22	22	21	20	21	21
	1.4	1.3	1.3	1.2	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.0	1.1	1.1

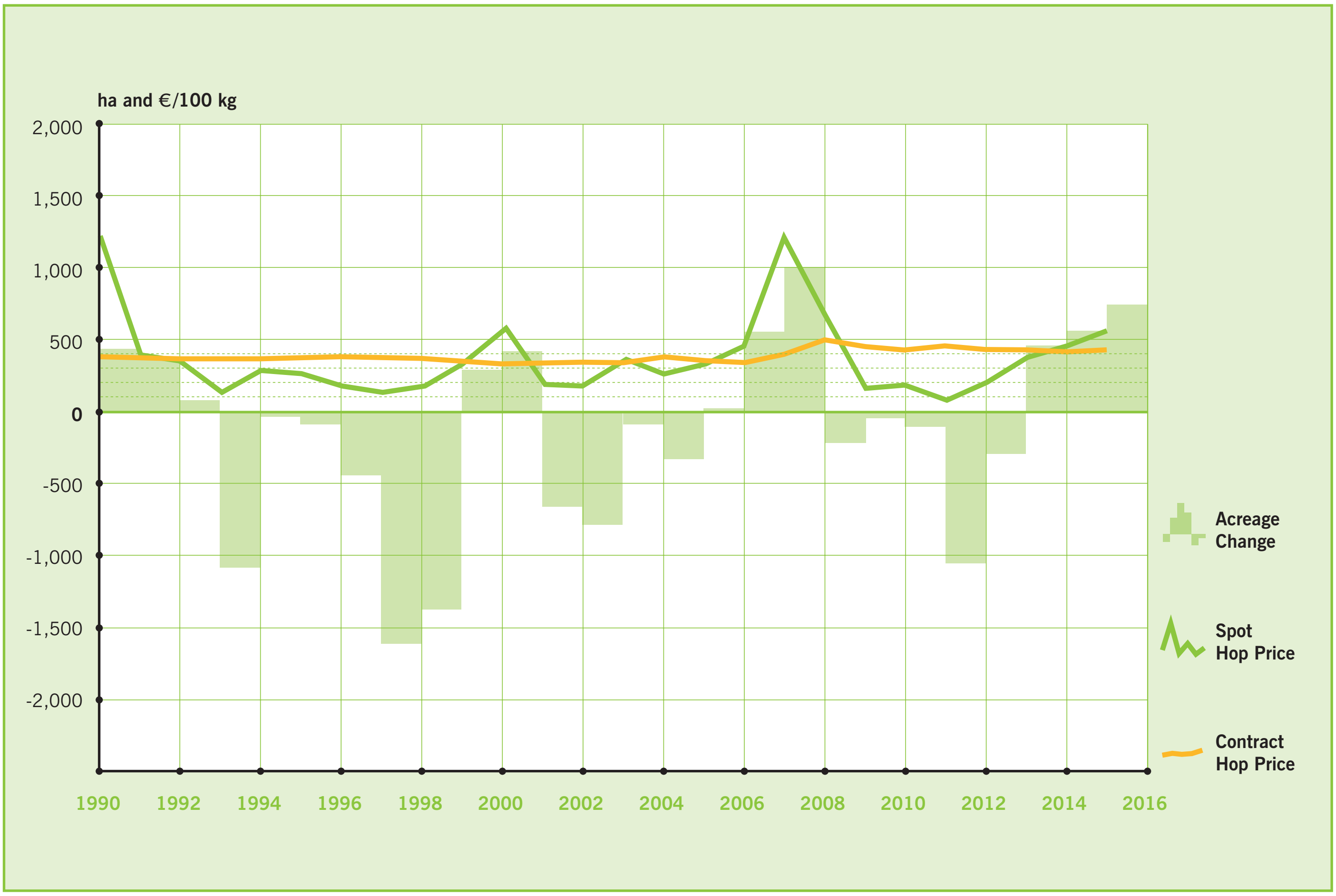
*Estimate

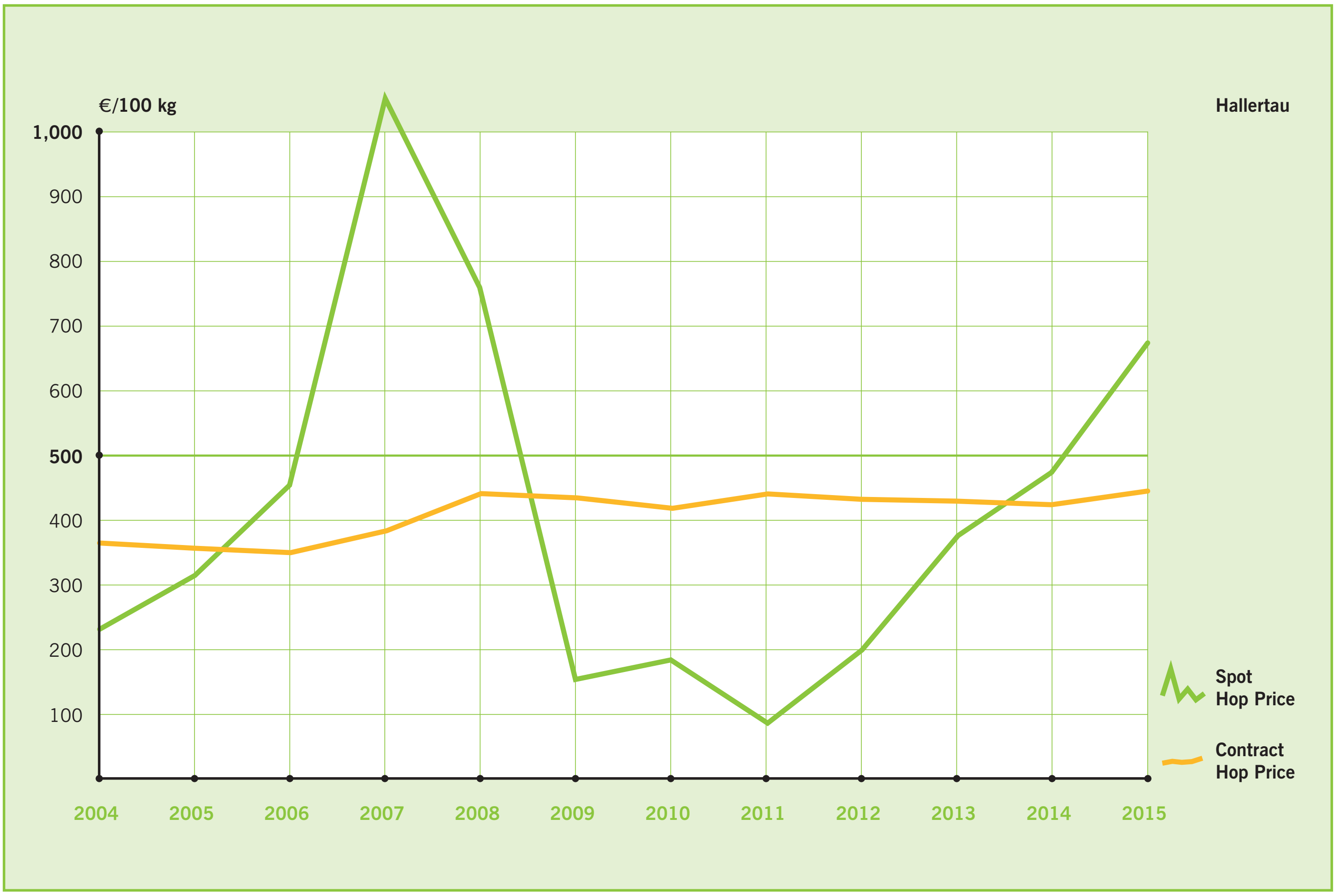
World Hop Acid Supply and Demand 2009 – 2016

	Production		Beer Production	Alpha Dosage	Alpha Usage	Annual Balance
	(mt Alpha)		(Mio hl)	(g Alpha/hl)	(mt Alpha)	(mt Alpha)
2009	10,062	2010	1,838	3.9	7,166	2,896
2010	8,192	2011	1,917	4.0	7,668	524
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*	1,956	4.5	8,802	- 1,964
2016*	9,150	2017*	1,964	4.6	9,034	116



*Estimate


ha and €/100 kg
2,000
1,500
1,000
500
0
-500
-1,000
-1,500
-2,000
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
Acreage Change
Spot Hop Price
Contract Hop Price


€/100 kg
Hallertau
1,000
900
800
700
600
500
400
300
200
100
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
Spot Hop Price
Contract Hop Price

Hop Market Review and Outlook

Looking back

Crop 2015 was notable for weak yields and low quality in European growing areas. This was caused by extreme and prolonged hot, dry conditions throughout the summer.

The average alpha content worldwide dropped to just 7.8 % from 8.6 % in 2014. The global crop of approximately 87,400 mt leaf hops represented an alpha volume of just 6,840 MT, compared to an estimated demand of 8,800 MT. This deficit of nearly 2,000 MTA existed despite a slight drop in world beer production to 1,956 mhl.

Successful management of the short crop was only possible with good cooperation between suppliers and customers. The alpha clause supported allocation of the reduced aroma hop volumes on an equitable, as-needed basis. In USA the market was stable due to a normal crop and a high percentage of forward contracts. Craft beer volume continued to grow well in excess of the market.

Looking forward

Crop 2015 was the fourth consecutive crop that came in short of annual demand. As a result, since 2013 it was expected that European prices would have begun an upward climb to close the unprecedented gap with USA that is exacerbated by the weak Dollar. In addition, new acreage was planted in many European growing areas. In USA the market continued to be strong and the acreage in the Pacific Northwest surged once again, up almost 18 %. In addition, an estimated 750 HA are grown in non-traditional states, led by Michigan. The resulting 21,433 ha made the USA the clear world acreage leader.

The world's acreage increased 8.6 % in 2016 to 56,100 ha. During most of the 2016 growing season conditions were ideal, especially for newly-planted hops. Temperatures were moderate and there was ample summer rainfall in Europe and winter snowpack for irrigation in USA. Nevertheless, temperatures and conditions in September led to significant mildew damage in both the Hallertau and the US Pacific Northwest. USA Super alpha and German Hercules hops were especially affected, leading to a smaller crop and, in USA, contract shortages. Despite this late development and somewhat lower high alpha tonnage and alpha values, crop 2016 was generally positive for yields and quality.

The crop in Germany is estimated to be approximately 42,600 MT, or an amazing 50 % more than 2015. Overall the European crop is estimated to reach 59,000 mt, or a plus of 40 % over 2015.

As mentioned above, growing conditions in USA were baby-hop friendly despite the disease pressure in September. The crop is expected to be over 42,000 MT, or an 18 % increase from 2015. The late-season powdery mildew pressure and resulting alpha and yield decreases once again raises the issue of variety succession. The first and second generation super high alpha varieties either were never disease resistant or have lost their tolerance over time. If alpha market conditions permit, growers will seek to replace the most unreliable of these acres with new, disease tolerant and even disease-resistant varieties that are propagated from cutting-edge independent breeding programs. Given the continued gap between USA and German alpha pricing, however, it is more likely that these acres will be replaced by aroma-type hops. Such a transition would put additional pressure on Germany to produce consistent, stable alpha and even increase its alpha acreage. The question remains how much late-harvest volume can be handled by the existing harvest infrastructure in Germany. Once that capacity is exceeded, prices for hops planted on additional acres will reflect the cost of significant capital investment, a development that has already occurred in USA.

Based upon recent analysis and estimates, the world's beer production expects slight near-term growth projections. The craft beer segment continues to grow worldwide, albeit at a slower rate than in the USA in previous years. Craft beer has a world market share of approximately 2 %, but has a significantly disproportionate influence on the hop market due to its high hopping rates. As a result, our estimated world alpha dosing figure has increased again to 4.6 g/a/hl.

The demand for alpha acids will therefore be approximately 9,000 mt, based on a world beer production of 1,964 mhl. If the 2016 world hop crop produces the expected 9,150 mt, then it will be the first crop in five years to actually meet or exceed expected demand on paper.

The theoretical undersupply of alpha that has existed for the past five years has led to a large decrease of brewery hop inventories. This means that any excesses of crop 2016 will be used to restock. We have already had an active spot market in Europe. Clearly the large unknown is the actual bitter-hop demand for crop 2016 and forward. The large shift in production towards 60 % aroma hops worldwide means that there is much less margin for error on the bitter side. Please refer to the data table that covers 2013-16 alpha production, which clearly shows the decrease in average alpha content to the 2016 level 8.4 %.

We expect a further acreage increase for crop 2017. The additional volume will be needed to stabilize and secure supply. A significant role of the hop industry is to provide that supply security via technology-driven breeding programs that lead to improved and stable yields. European producers need to increase their focus on the infrastructure investments needed to ensure stable supply, for example irrigation systems in Germany and new bitter varieties. As usual, it falls upon brewers to be as transparent as possible to communicate their needs to the hop industry and thus avoid the boom/bust market cycle.

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