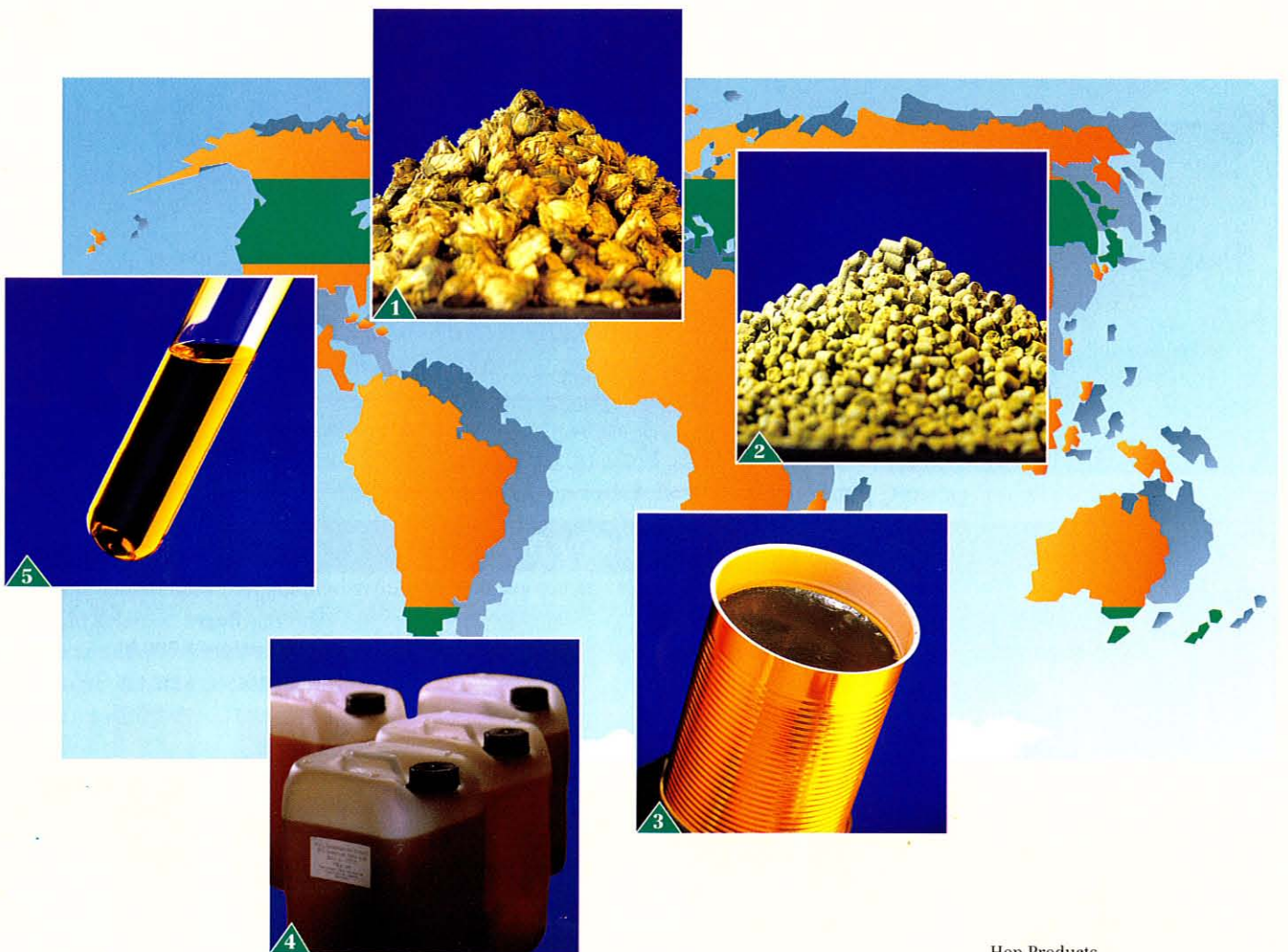


THE BARTH REPORT

HOPS 1998/99



Hop Products

- | | |
|---|-------------------------|
| 1 | Cone hops |
| 2 | Pellets |
| 3 | CO ₂ extract |
| 4 | Isomerized extract |
| 5 | Hop oil |

Joh. Barth & Sohn

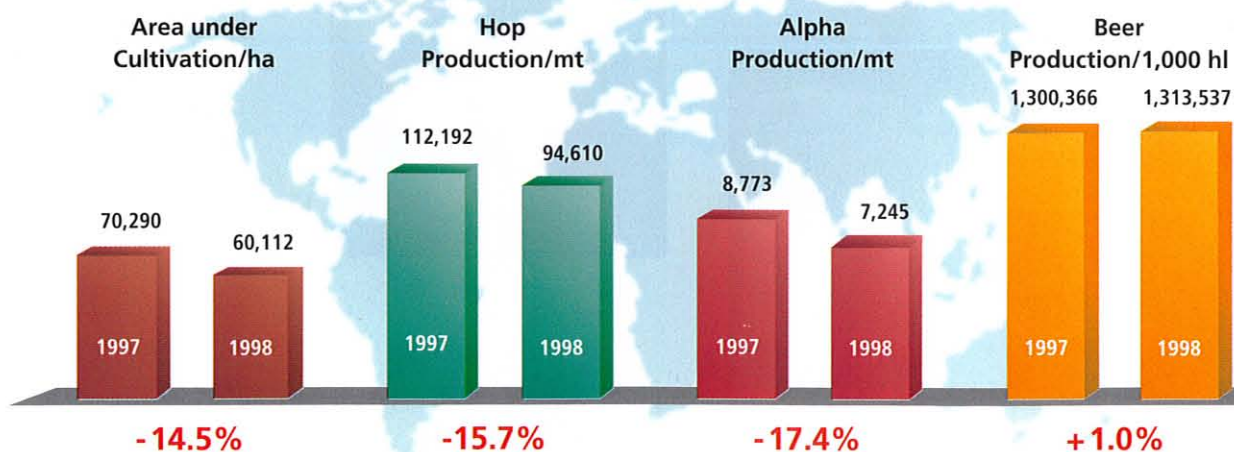


Nuremberg

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World Market Key Data



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 Nuremberg, July 1999



FOREWORD

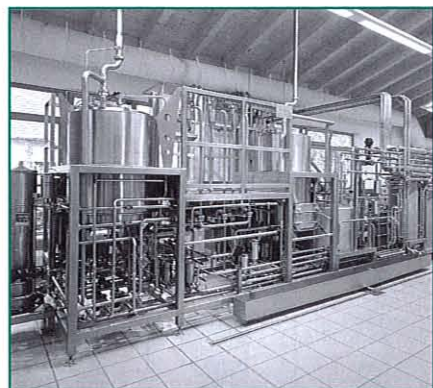
Dear Reader,

On 8 September 1998, the partners and management of the companies Hopfenveredlung and Hopfen-Extraktion HVG Barth, Raiser & Co. presented the hop industry's first research brewery to numerous guests from Germany and abroad in a ceremonial opening event.

The aim of this research brewery, equipped with the latest technology, and the adjoining visitor and training centre is to obtain clear, reproducible findings about hops as a raw material and to pass on this knowledge to the brewing industry. The research brewery has all the essential features of a production plant. Its output volume is 200 litres.

The research spectrum includes the following main activities:

- comparing different and new hop varieties
- examining and developing new hop products
- studying the influence of individual hop substances, substance groups and selected hop fractions
- examining and testing the dosage points for hop products during beer production
- investigating the interaction of hop substances, such as beta acids, hop oils and polyphenols
- testing strictly confidential recipes and trial brews for domestic and foreign brewers.



Brewing house

The positive response to the research brewery by the global brewing industry confirms that this was the right investment in a difficult period for the hop industry.

Our extraction business unit, Hopfen-Extraktion HVG Barth, Raiser & Co., is pleased with the continued growth of its subsidiary NATECO₂ (natural substance extraction using CO₂). This company is involved in a wide range of marketing services based on CO₂ high-pressure technology applied to other natural substances in addition to hops. In the meantime, processing of natural substances accounts for a significant share of the total turnover of Hopfen-Extraktion HVG Barth, Raiser & Co.

In order to secure the long-term future of our company and to achieve a broader sales base, we have concluded an exclusive licence agreement with a foreign company to extend and improve patents regarding hop applications outside the brewing industry.

We are sure that our activities and innovation efforts will have a positive and stabilizing effect on the hop industry in the medium term.

JOH. BARTH & SOHN



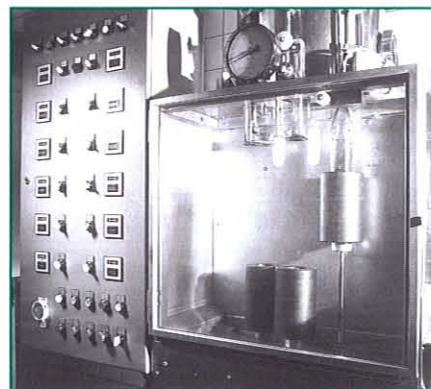
Fermenting and storage cellar



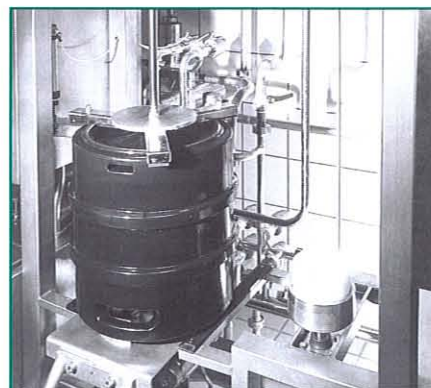
Visitor and training centre



Filtering



Bottling



Keg filling

POLITICAL SITUATION

In the autumn of 1998 after 16 years in office, the centre-right coalition government under Chancellor Helmut Kohl was ousted by a red-green coalition under Chancellor Gerhard Schröder.

The situation in Russia was characterized by economic and governmental crises. In August 1998, President Yeltsin dismissed the government. Only after several weeks was the Duma able to agree with the president on the new prime minister Primakov. After a mere 8 months in office, he too was dismissed and succeeded as prime minister by the minister of the interior, Stepashin.

In March 1999, shortly before its 50th anniversary, NATO was enlarged to 19 members with the accession of Poland, the Czech Republic and Hungary. This was the first time that members of the former Warsaw Pact joined the alliance.

The crisis of the co-existence of the different ethnic sections of the population in Yugoslavia further escalated dramatically in the first half of 1999. After the failure of repeated efforts to achieve a diplomatic solution for Kosovo and the refusal of Yugoslavia's President Milosevic to accept the Rambouillet treaty, NATO commenced air attacks on military and economi-

cally strategic targets in Yugoslavia on 24 March. The operation ended on 10 June, once it had been established that the Yugoslav army was pulling out of Kosovo and that pacification could commence under a UN mandate.

Early elections in Israel resulted in victory for the Labour Party under Ehud Barak. He is now the focus of expectations that the stalled Middle East peace process can be resumed.

The decades-old conflict between India and Pakistan over the region of Kashmir to which both sides lay claim became dangerously aggravated in the second quarter of 1999.

ECONOMIC SITUATION

Growth in gross national product worldwide was forecast at 2.0% for 1998, but since mid-1998 the various continents have developed unevenly. The destabilization of the finance systems in Asia in 1998 caused the economies of the nations directly involved – Thailand, Malaysia, Indonesia and South Korea – to slump by an average of approx. 7%. The worsening state of the Japanese economy proved to be a further negative factor.

In August 1998, Russia reacted to several months of financial crisis by floating, and in effect devaluing, the

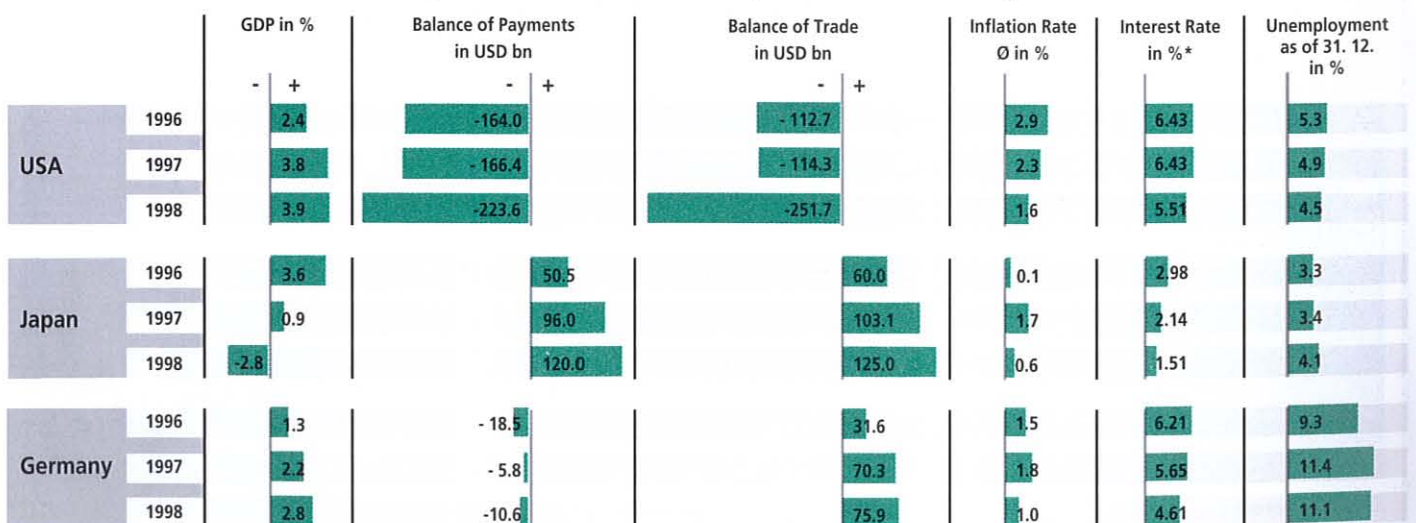
rouble. As a result, the Russian currency lost 70% of its value by March 1999. Concerns about Russia's political and economic stability, combined with fear of a global recession, triggered share price losses on the world's stock exchanges from August to October 1998. Contrary to expectations, the threatening situation in Russia seemed to be stabilized by mid-1999.

The devaluation of the Brazilian real in January 1999 once again illustrated the weakness of the economies of Latin America in relation to the US

dollar. It was only thanks to the continued strength of the economy in the USA and the stable economic conditions in Europe that the problems in the emerging economies around the world did not lead to a global recession.

The 11-member European Monetary Union came into being as planned on 1 January 1999. The exchange rates of the member state's currencies are now fixed in relation to the euro (see page 9).

Key Data of the USA, Japan and Germany



* Interest rate: public bonds (10-year term)



WORLD BEER PRODUCTION 1997/98

Figures in 1,000 hl

Europe		
Country	1997	1998
Germany	114,800	111,700
Great Britain	59,139	56,652
Russia (CIS)	26,100	32,530
Spain	24,773	24,991
Netherlands	24,701	23,988
Poland	18,804	20,216
France	19,483	19,807
Czech Republic	18,649	18,292
Belgium	14,168	14,105
Italy	11,455	12,193
Romania	7,506	10,250
Austria	9,366	8,830
Ireland	8,152	8,478
Denmark	9,180	8,075
Turkey	7,448	7,131
Hungary	7,168	6,979
Ukraine (CIS)	6,090	6,830
Portugal	6,623	6,784
Yugoslavia	5,876	6,388
Finland	4,793	4,660
Sweden	4,899	4,609
Slovak Republic	4,394	4,485
Greece	3,945	3,986
Bulgaria	3,004	3,832
Croatia	3,607	3,831
Schweiz	3,563	3,586
Norway	2,298	2,166
Slovenia	2,123	2,100
Lithuania	1,356	1,464
Belorussia (CIS)	1,200*	1,214*
Kazakhstan (CIS)	730	850
Bosnia-Herzegovina	620	850*
Latvia	687	662
Estonia	585	621
Macedonia	600	578
Georgia (CIS)	450	495
Luxemburg	481	469
Uzbekistan (CIS)	500	420
Cyprus	320	350
Other CIS-countries ¹⁾	400*	250
Malta	132*	131*
Albania	152	120*
Iceland	51	84
Armenia	52	52*
Azerbaijan (CIS)		
Total	440,438	446,099

Australia/Oceania		
Country	1997	1998
Australia	17,349	17,570
New Zealand	3,214	3,888
Papua New Guinea	390	397
Fiji Islands	161	170
Tahiti	146	154
New Caledonia	125	126
Samoa	45	50
Solomon Islands	19	20
Tonga	8	8
Vanuatu	6	6
Total	21,463	22,389

America		
Country	1997	1998
USA	236,430	238,000
Brazil	88,200	88,000*
Mexico	51,949	54,791
Canada	22,355	22,779
Colombia	20,000	18,300*
Venezuela	17,232	17,750
Argentina	12,063	12,400
Peru	7,428	7,200
Chile	3,640	3,666
Dominican Republic	2,400	2,600
Ecuador	2,270	2,300
Bolivia	1,800	1,800
Panama	1,350	1,448
Paraguay	1,600	1,400
Guatemala	1,303	1,363
Cuba	1,697	1,250
Costa Rica	1,200	1,200
Honduras	1,184	1,108
Uruguay	800	900
El Salvador	700	900
Jamaica	674	669
Nicaragua	400	400
Puerto Rico	314	400
Guyana	180	400
Trinidad	320	300
Haiti	140	200
Bahamas	139	143
Dutch Islands	135	125
Surinam	89	110
Belize	70	100
Barbados	112	88
St. Lucia	92	76
Martinique	70*	70*
St. Vincent	35	38
Grenada	34	35
Antigua	22	25
St. Kitts	18	18
Dominica	12	12
Cayman Islands	4	4
Total	478,461	482,368

Asia		
Country	1997	1998
China	170,000*	173,000*
Japan	72,200	71,789
South Korea	16,740	14,080
Philippines	13,475*	12,688
Thailand	8,360	9,305
Vietnam	5,680	6,562
India	4,250	4,340
Taiwan	3,900	4,229
Malaysia	1,477	1,448
Indonesia	1,722	1,292
Hong Kong	890	850*
Israel	800*	802*
Singapore	804	758
Sri Lanka	266	398
Nepal	350	350*
Laos	286	332
Cambodia	175*	180
Lebanon	126	127
Syria	102	103
Mongolia	100*	100*
Myanmar (Burma)	60*	60*
Jordan	56	54
Irak	50*	50*
Pakistan	20	22
Total	301,889	302,919

Africa		
Country	1997	1998
South Africa	25,000	25,639
Nigeria	4,300	4,200
Cameroon	3,253	3,466
Kenya	3,000	2,750
Zimbabwe	1,649	1,760
Tanzania	1,615	1,650
Zaire	1,525	1,580
Ivory Coast	1,240	1,400
Uganda	830	1,142
Angola	980	1,071
Burundi	1,161	1,016
Ethiopia	956	1,000
Namibia	888	985
Ghana	773	889
Marocco	800	857*
Gabon	801	850
Tunesia	817	780
Malawi	760*	780*
Mozambique	698	764
Ruanda	808	681
Zambia	558	600
Egypt	550	558
Madagascar	350*	507
Burkina Faso (Upper Volta)	458	491
Botswana	419	491
Congo	347	489
Mauritius	347	411
Lesotho	398	385
Benin	358	330
Togo	292	320
Réunion	239	262
Swaziland	294	250
Eritrea	218	220
Central African Republic	207	220
Senegal	162	170
Guinea	131	136
Chad	157	132
Algeria	350	120
Seychelles	70	80
Mali	65	71
Niger	72	70
Liberia	60	55
Cape Verde Islands	54*	42
Sierra Leone	60*	41
Guinea Bissau	25*	30*
Gambia	20	21
Total	58,115	59,762

1) Kirgizstan, Moldova, Tajikistan, Turkmenistan, (although geographically belonging mainly to Asia, the entire CIS is listed under Europe for the time being for reasons of comparability).

* estimate

In italics: corrections for 1997 as stated in last year's report; these figures became available after going to press

WORLD TOTAL	
1997	1998
1,300,366	1,313,537



OUTPUT DEVELOPMENT

	1997 1,000 hl	1998 1,000 hl	1997 +/- % rel.	1998 +/- % rel.
European Union	315,958	309,327	0.6%	-2.1%
Rest of Europe	124,480	136,772	6.6%	9.9%
Europe total	440,438	446,099	2.2%	1.3%
North America	258,785	260,779	0.1%	0.8%
Central America/Caribbean	64,374	67,363	10.0%	4.6%
South America	155,302	154,226	1.6%	-0.7%
America total	478,461	482,368	1.8%	0.8%
Africa	58,115	59,762	4.0%	2.8%
Asia	301,889	302,919	4.0%	0.3%
Australia/Oceania	21,463	22,389	-1.4%	4.3%
WORLD TOTAL	1,300,366	1,313,537	2.5%	1.0%

The change in growth rates from the 1997/98 report is due to the adjustment of the beer output figures for 1997.

For the first time in six years, annual beer output grew by only 1% worldwide. The fact that even this slight increase occurred was thanks primarily to growth in the countries of Eastern Europe. The industrialised countries of Europe and North America, on the other hand, continued to be characterised by stagnation, or even recession.

In Asia, the stagnation in output for the first time was a clear sign of the finance crisis.

MARKET ANALYSIS

Crop year 1998 will go down in the hop history books as a difficult year, as the worldwide crisis in hop growing, processing and trading worsened further.

Having reached a peak of 103,144 ha in 1988, hop acreage has declined by 41.7% and hop volume by 33.2% in only one decade. The volume of alpha acids produced in the same period, on the other hand, has remained virtually unchanged. The brewing industry's demand for alpha acids has decreased by 2.2%, while world beer output has increased by 18.9%. These figures clearly show the depth of structural change in the hop industry.

For the first time since 1995, the 1998 harvest produced an alpha deficit amounting to approx. 4.2% of requirements. However, this supply shortfall did not bring about a recovery in hop prices on the spot and, above all, the contract markets. The main reason for this was the stockpiling by the world brewing industry in previous years combined with negative economic developments affecting beer sales.

The hop industry felt the effects of these developments acutely. Due to the disappointing alpha crop in the USA and what was at best an average crop in Germany, prices rose much higher than in previous years, thus removing any incentive for the brewing industry to buy. Requirements

were met by purchases on the spot market covering only the current brewing year, insofar as they were not covered by existing stocks anyway.

As in the years before, market development worldwide was determined by Germany and the USA. Before the harvest, the market was influenced on the one hand by the widespread expectation in the hop and brewing industries that there would be a record crop in both of these countries, which would further increase the alpha surplus, and, on the other hand, by the suspicion which was confirmed in the course of the growing season that aroma acreage was being taken out of production too slowly in Germany in particular.

Consequently, the spot markets in these countries got off to a very sluggish start. Only after it became clear that US growers of high-alpha hops in particular had had a poor harvest and German growers an average one, did demand increase on the part of the trade. Although there was a consoli-

dation of prices at a higher level than in the years before, they were still below the growers' production costs.

The hop industry continues to be seriously affected by the following underlying trends:

- the accelerating concentration in the international brewing industry,
- the sustained trend towards beer with lower bitter content,
- growth in beer production only in countries with traditionally lighter beers,
- the increased use of highly efficient downstream products.

As a result, further concentration has taken place in the international hop trade in the past year, too. It is likely that this trend will continue and that the process of contraction will go on at all levels of the hop industry. The long-term nature of this economic weakening of the hop industry therefore has the potential to endanger the supply of hops to the brewing industry.

Forward contract rates in % (as per spring 1999)

Country	1999	2000	2001	2002	2003
Germany	65	57	35	24	14
USA	89	68	46	36	11
Czech Republic	85	70	25	18	15
England	41	32	19	19	6
Slovenia	40	25	25	10	---



HOP ACREAGE AND PRODUCTION 1997/98

		1997				1998			
		Acreage ha	Production mt	Ø-Alpha %	Alpha mt	Acreage ha	Production mt	Ø-Alpha %	Alpha mt
Germany	Hallertau	17,440	28,675.9	8.8	2,511	15,906	25,926.9	7.5	1,945
	Tettngang	1,666	2,600.4	5.0	130	1,633	2,189.6	3.9	85
	Elbe-Saale	1,526	1,802.8	11.6	208	1,457	2,001.0	9.7	194
	Spalt	627	829.6	5.8	48	569	629.5	4.7	30
	Hersbruck	106	146.2	5.7	8	102	148.4	5.2	8
	Others	16	27.9	7.8	2	16	24.1	6.5	2
	Total		21,381	34,082.8	8.5	2,907	19,683	30,919.5	7.3
England		3,067	4,474.1	8.5	380	2,447	3,270.7	8.3	271
Spain		847	1,157.6	9.4	109	827	1,435.8	9.4	135
France		774	1,148.9	3.6	41	799	1,268.9	3.2	41
Belgium		304	549.5	9.9	54	262	539.8	9.5	51
Austria		247	376.7	7.6	29	245	384.3	7.0	27
Portugal		128	100.0	11.5	12	65	56.0	11.0	6
Ireland		6	8.8	10.0	1	6	9.5	10.6	1
EUROPEAN UNION		26,754	41,898.4	8.4	3,533	24,334	37,884.5	7.4	2,796
Czech Republic	Zatec (Saaz)	5,640	5,202.0	3.7	192	4,458	3,758.3	3.6	135
	Ustek (Auscha)	936	1,185.0	3.8	45	674	679.8	3.5	24
	Trsice (Tirschitz)	875	1,010.0	3.4	34	510	479.9	3.6	17
	Others	15	14.0	3.7	1	15	12.3	3.6	0
Total		7,466	7,411.0	3.7	272	5,657	4,930.3	3.6	176
Poland		2,480	3,175.0	6.4	203	2,080	2,100.0	6.1	129
Slovenia		2,326	4,194.0	7.3	306	2,010	3,150.0	7.0	221
Russia		1,697*	847.0*	3.8	32	1,330	624.3	4.3	27
Ukraine		1,900*	740.0*	5.6	41	1,200*	1,000.0*	5.0	50
Romania		713	622.0*	6.0	37	500*	225.0*	6.0	14
Yugoslavia		589	930.0	4.9	46	477	700.0	5.3	37
Slovak Republic		777	772.0	3.6	28	450	400.0	3.6	14
Bulgaria		385	312.0	7.2	22	350	280.0	8.2	23
Turkey		297	292.0	9.0	26	284	198.5	9.0	18
Switzerland		22	44.7	7.0	3	22	46.4	7.0	3
REST OF EUROPE		18,652	19,339.7	5.3	1,016	14,360	13,654.5	5.2	712
EUROPE		45,406	61,238.1	7.4	4,549	38,694	51,539.0	6.8	3,508
USA	Washington	12,587	25,318.1	9.1	2,304	10,762	20,316.9	10.2	2,072
	Oregon	3,382	6,156.4	8.8	542	2,495	4,639.1	9.0	418
	Idaho	1,568	2,487.6	6.9	172	1,584	2,054.5	6.4	131
Total		17,537	33,962.1	8.9	3,018	14,841	27,010.5	9.7	2,621
Argentina		212	196.0	6.5	13	167	194.0	6.5	13
Canada ¹⁾		125	94.0	4.0	4	0	0	0	0
AMERICA		17,874	34,252.1	8.9	3,035	15,008	27,204.5	9.7	2,634
South Africa		651	985.0	10.2	100	601	955.0	10.5	100
AFRICA		651	985.0	10.2	100	601	955.0	10.5	100
China		4,334	11,602.0	5.7	661	4,276	12,057.0	6.0	723
Japan		398	762.4	6.0	46	360	618.6	6.8	42
India		215	33.5	6.0	2	215	29.6	6.0	2
South Korea		5	4.4	2.3	0	5	4.5	2.3	0
ASIA		4,952	12,402.3	5.7	709	4,856	12,709.7	6.0	767
Australia		1,053	2,545.0	11.3	288	604	1,557.0	10.2	159
New Zealand		354	769.0	13.1	101	349	644.4	12.4	80
AUSTRALIA/OCEANIA		1,407	3,314.0	11.7	389	953	2,201.4	10.9	239
WORLD		70,290	112,191.5	7.8	8,782	60,112	94,609.6	7.7	7,248

¹⁾ Hop cultivation was discontinued

²⁾ estimate

Any differences to the table on page 8 are rounding differences.



ALPHA ACID PRODUCTION

Alpha acid production worldwide was recorded according to the following groups of varieties:

Group A:	Finest aroma hops, such as: Saaz, Tettnang, Spalt
Group B:	Aroma hops, such as: Hallertau, Hersbruck, Perle, Spalt Select, Hallertau Tradition, Golding, aroma hops from USA, England, etc.
Group C:	Hops without significance for the world market (both aroma and bitter)
Group D:	Bitter hops, such as Northern Brewer, Brewers Gold, Cluster, Pride of Ringwood, high alpha hops from USA, England, Australia and Germany, etc.

With world hop volume divided into these groups, alpha acid production was as follows:

Group	1997					1998				
	Crop Share	Crop mt	Alpha Ø	Alpha mt	Alpha Share	Crop Share	Crop mt	Alpha Ø	Alpha mt	Alpha Share
A	10.0%	11,188	4.1%	459	5.2%	8.6%	8,146	3.7%	301	4.2%
B	33.0%	37,016	5.8%	2,147	24.5%	32.9%	29,922	5.3%	1,586	21.9%
C	20.0%	23,809	7.0%	1,667	19.0%	23.5%	22,204	6.5%	1,443	19.9%
D	35.8%	40,179	11.2%	4,500	51.3%	36.3%	34,338	11.4%	3,915	54.0%
Total	100.0%	112,192	7.8%	8,773	100.0%	100.0%	94,610	7.7%	7,245	100.0%

All alpha acid values were recorded on the basis of % as is, EBC Analytica 7.4. Any differences to the table on page 7 are rounding differences.

Year-on-year, production volume fell by 15.7% and alpha acid volume by as much as 17.4% in 1998. This decrease is mostly due to acreage reduction.

The average alpha level worldwide was only slightly below the all-time high of 7.8% recorded in 1997.

The growers in the USA succeeded in further increasing their share of world alpha production from 34.3% in the previous year to 36.3%. Germany's share fell slightly from 33.1% to 31.2%.

Together, these two countries alone account for 67.5% – i.e. two thirds – of world alpha production.

In Group A, the shifts observed in the previous year continued: Germany increased its market share from 34.2% to 37.5%, while the Czech Republic fell back slightly from 59.7% to 57.9%. This variety group's share of world production volume dropped further.

Germany still has by far the largest share (52.1%) of Group B, while the

USA (17.5%) lags well behind in aroma hop production.

Although the volume produced in the USA was disappointing with regard to alpha content, the USA's share of Group D rose to 59.3% (54.3% in previous year). Germany's share fell from 34.0% to 33.6%.

In global terms, the use of bitter and high-alpha varieties is continuing to increase at the expense of the finest and fine aroma varieties.

ALPHA ACID BALANCE

Alpha demand			Alpha production		Alpha supply	
Calendar year	Hopping rate	Demand	Crop year	Production	Surplus	Deficit
1995	6.3 g α/hl	7,865 mt α	1994	6,907 mt α	---	958 mt α
1996	6.2 g α/hl	7,866 mt α	1995	7,831 mt α	---	35 mt α
1997	6.1 g α/hl	7,932 mt α	1996	9,300 mt α	1,368 mt α	---
1998	5.8 g α/hl	7,619 mt α	1997	8,783 mt α	1,164 mt α	---
1999*	5.7 g α/hl	7,562 mt α	1998	7,245 mt α	---	317 mt α

* Estimated demand The change in alpha supply from the 1997/98 report is due to the adjustment of the beer output figures for 1997.

On average, hopping rates in alpha terms are decreasing. Nevertheless, after two years with high surpluses, alpha acid production again fell short

of arithmetical requirements in crop year 1998. For the first time since 1995 there was an alpha supply deficit of approx. 4.2% of volume required

(317 tons of alpha). This deficit was compensated for by high stockpiles at the breweries (market analysis, see page 6).



EUROPEAN UNION

Producer subsidies

In accordance with directive (EC) No. 1554/97 of July 1997, a standard subsidy is paid applying to all variety groups. This subsidy amounts to 480 ecus per hectare per year for five years as of crop year 1996 and is to be paid by 31 December of the respective crop year.

Growers associations marketing their members' total production volume are permitted to withhold up to 20% of the subsidy and use it for the following measures:

- crop pooling and market stabilization;
- alignment of hop growing with market requirements, in particular through variety conversion, reorganization of planting, sales promotion and research into production, marketing and integrated pest control;

- promotion of rationalization and mechanization of farming and harvesting methods to improve profitability and environmental protection;
- deciding which hop varieties may be grown by members and drawing up common rules for hop growing.

Growers associations that do not market their members' total production volume are even obliged to withhold 20% of the subsidy and use it for the above measures.

Set-aside

Directive (EC) No. 1098/98 regarding a set-aside and clearing programme (see Barth Report "Hops 1997/98") was passed in May 1998. Although this was relatively late for crop year 1998, applications for subsidies were still made by 879 hop growers in Hallertau, by far the largest hop-growing region in the

European Union. An area of 926.65 ha was temporarily taken out of production and a further 488.03 ha was cleared completely. For 1999 a further total of approx. 1,250 ha is being set aside or cleared within the framework of this programme.

In total, hop acreage in the EU was reduced by 9.0% year-on-year (14.5% worldwide) while production volume fell by 9.6% (15.7% worldwide). Although the reduction in the EU in these factors was significantly below the international average, alpha production in the EU decreased by 20.9%, which was greater than the reduction worldwide of 17.4%

Conversion Table

Area:

1 hectare (ha) = 10,000 m ²	= 2.934 bayerische Tagwerk
1 hectare (ha) = 10,000 m ²	= 2.471 acres
1 bayerisches Tagwerk	= 0.341 ha
1 acre	= 0.405 ha

Length:

1 yard	= 3 feet = 36 inches = 91.44 cm
1 mile	= 1.609 km

Volume:

1 hl = 100 l	= 26.42 gall = 0.8523 bbl (USA)
1 hl = 100 l	= 22.01 gall = 0.6114 bbl (GB)
1 barrel (bbl/USA)	= 31 gall = 1.1734 hl
1 barrel (bbl/GB)	= 36 gall = 1.6365 hl

Weight:

1 metr. ton (mt) = 1,000 kg	= 20 Ztr. = 2,204.6 lbs
1 Zentner (Ztr.) = 50 kg	= 110.23 lbs = 1.102 cwt (USA)
	= 110.23 lbs = 0.984 cwt (GB)
1 hundredweight (cwt./USA)	= 100 lbs = 45.359 kg = 0.9072 Ztr.
1 hundredweight (cwt./GB)	= 112 lbs = 50.800 kg = 1.0160 Ztr.
1 cental (GB)	= 100 lbs = 45.359 kg = 0.9072 Ztr.
1 kg	= 2.20462 lbs
1 lb	= 0.45359 kg

Temperatures:

from Fahrenheit into Celsius	from Celsius into Fahrenheit
$86^{\circ}\text{F} = \frac{(86 - 32) \times 5}{9} = 30^{\circ}\text{C}$	$30^{\circ}\text{C} = \frac{30 \times 9}{5} + 32 = 86^{\circ}\text{F}$

Pressure:

1 bar = 14,5038 psi	1 psi = 0,06895 bar
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Currencies of the European Monetary Union

1 EUR equals:	(on 1 January 1999)
Austria	13,7603 ATS
Belgium	40,3399 BEF
Finland	5,94573 FIM
France	6,55957 FRF
Germany	1,95583 DEM
Ireland	0,787564 IEP
Italy	1,936,27 LIT
Luxemburg	40,3399 LUX
Netherlands	2,20371 NLG
Portugal	200,482 PTE
Spain	166,386 ESP

Currency Exchange Rates

1 EUR equals	(on 2 June 1999)
(reference rates by ECB):	
Australia *	1,6075 AUD
Canada *	1,5400 CAD
Czech Republic	37,4770 CZK
Denmark	7,4317 DKK
Great Britain *	0,6443 GBP
Japan	125,7100 JPY
New Zealand *	1,9689 NZD
Norway	8,2415 NOK
Poland	4,1445 PLN
Sweden	8,9830 SEK
Switzerland	1,5912 CHF
USA *	1,0382 USD

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

* = 1 unit

all others = 100 units



GERMANY

Acreage and Production

Area	Variety	Development of Acreage			Development of Production			
		1997	+/- Acreage ha	1998	1997 Ø-Yield mt/ha	1998	1997 Production mt	1998
Hallertau	Perle	3,815	-362	3,453	1.68	1.65	6,397.00	5,691.86
	Hersbruck	3,011	-664	2,347	1.61	1.58	4,835.20	3,714.41
	Hallertau Tradition	1,966	18	1,984	1.61	1.77	3,163.95	3,511.31
	Spalt Select	1,257	-99	1,158	1.88	1.81	2,368.05	2,100.23
	Hallertau	612	14	626	1.17	1.17	716.35	734.98
	Huell	93	-58	35	1.53	1.26	142.55	44.06
	Total Aroma	10,754	-1,151	9,603	1.64	1.64	17,623.10	15,796.85
	Northern Brewer	2,281	-543	1,738	1.54	1.61	3,516.50	2,804.04
	Brewers Gold	496	-269	227	2.13	2.14	1,055.40	486.52
	Orion	55	-23	32	1.73	1.58	95.15	50.66
	Total Bitter	2,832	-835	1,997	1.65	1.67	4,667.05	3,341.22
	Hallertau Magnum	2,476	355	2,831	1.73	1.59	4,287.60	4,504.67
	Taurus	*	*	753	*	1.25	*	938.09
	Nugget	663	-75	588	2.21	1.87	1,467.75	1,101.91
	Target	94	-22	72	2.13	2.07	200.60	148.90
	Total High Alpha	3,233	1,011	4,244	1.84	1.58	5,955.95	6,693.57
	Record	62	-16	46	1.66	1.51	102.70	69.53
	Others	559	-543	16	0.59	1.61	327.10	25.72
	Total Hallertau	17,440	-1,534	15,906	1.64	1.63	28,675.90	25,926.89
Tettngang	Tettngang	1,102	-32	1,070	1.40	1.25	1,547.80	1,337.30
	Hallertau	563	0	563	1.86	1.51	1,049.50	852.25
	Hersbruck	1	-1	0	3.10	0.00	3.10	0.00
	Total Tettngang	1,666	-33	1,633	1.56	1.34	2,600.40	2,189.55
Elbe-Saale	Perle	126	3	129	1.06	1.33	134.05	171.85
	Saaz	9	-4	5	0.93	0.49	8.35	2.45
	Other Aroma	18	-5	13	1.39	1.57	25.05	20.45
	Total Aroma	153	-6	147	1.09	1.32	167.45	194.75
	Northern Brewer	678	-133	545	1.05	1.27	710.10	690.95
	Other Bitter	9	-5	4	1.58	2.13	14.25	8.50
	Total Bitter	687	-138	549	1.05	1.27	724.35	699.45
	Hallertau Magnum	503	49	552	1.38	1.50	694.10	829.40
	Nugget	113	-2	111	1.68	1.66	190.20	184.30
	Taurus	62	30	92	0.25	0.85	15.30	77.95
	Other High Alpha	7	-1	6	1.53	2.53	10.70	15.15
	Total High Alpha	685	76	761	1.33	1.45	910.30	1,106.80
Others	1	-1	0	0.70	0.00	0.70	0.00	
Total Elbe-Saale	1,526	-69	1,457	1.18	1.37	1,802.80	2,001.00	
Spalt	Spalt	180	6	186	1.01	0.83	182.65	154.75
	Hallertau	183	-19	164	1.16	1.01	212.00	165.35
	Spalt Select	150	-10	140	1.82	1.45	273.00	203.25
	Hersbruck	75	-29	46	1.47	1.37	110.05	63.20
	Perle	21	-3	18	1.48	1.42	31.15	25.50
	Hallertau Tradition	15	-3	12	1.20	1.21	18.05	14.50
	Total Aroma	624	-58	566	1.33	1.11	826.90	626.55
	Bitter	3	-1	2	0.90	1.40	2.70	2.80
	Others	0	1	1	0.00	0.20	0.00	0.20
Total Spalt	627	-58	569	1.32	1.11	829.60	629.55	
Hersbruck	Spalt Select	27	0	27	1.78	1.75	48.10	47.20
	Hallertau	28	-2	26	1.00	1.07	27.95	27.80
	Perle	18	0	18	1.36	1.45	24.45	26.05
	Hersbruck	17	-2	15	1.24	1.40	21.05	21.05
	Other Aroma	8	0	8	1.66	1.87	13.25	14.95
	Total Aroma	98	-4	94	1.38	1.46	134.80	137.05
	Bitter	5	0	5	1.65	1.50	8.25	7.50
	High Alpha	2	0	2	1.05	1.93	2.10	3.85
	Others	1	-1	0	1.00	0.00	1.00	0.00
Total Hersbruck	106	-5	101	1.38	1.47	146.15	148.40	
Baden/ Eifel/ Rhineland- Palatinate	Aroma	10	0	10	1.55	1.45	15.50	14.45
	Bitter	3	0	3	2.55	1.80	7.65	5.40
	High Alpha	3	0	3	1.60	1.42	4.80	4.25
	Total Baden/Ei./Rh.-P.	16	0	16	1.75	1.51	27.95	24.10
Total Aroma	13,305	-1,252	12,053	1.61	1.57	21,368.15	18,959.20	
Total Bitter	3,530	-974	2,556	1.53	1.59	5,410.00	4,056.37	
Total High Alpha	3,923	1,088	5,011	1.75	1.56	6,873.15	7,808.67	
Total Others	623	-561	62	0.69	1.54	431.50	95.25	
GERMANY TOTAL	21,381	-1,699	19,682	1.59	1.57	34,082.80	30,919.49	

* Included in "Others".



Growth, crop estimate and weights

While precipitation in October almost equalled the 50-year mean, the level recorded in November was only 30% of the long-term average. Winter began with slightly below-average rainfall in December, followed by exceptionally dry weather during the remaining months of winter and spring. From January through May 1998, rainfall of only 139 mm was measured, which corresponds to less than 50% of long-term average precipitation.

The winter months were characterised by unusually mild temperatures with the result that the average monthly temperature did not fall below zero. This phenomenon continued throughout the growing period. Each month, average temperatures were above the long-term mean. Due to the combination of above-average high temperatures on the one hand and extremely low rainfall on the other, all the spring work was completed early and quickly.

The months of June and July played a decisive part in the favourable development of the hops. In June, rainfall was relatively evenly distributed for the first time and exceeded the monthly average significantly. July proved that the influence of precipitation on hop development depends not

Area	Estimate 08/1998 mt	Weight 31.03.1999 mt
Hallertau	25,500	25,927
Tett nang	2,315	2,190
Elbe-Saale	1,965	2,001
Spalt	730	630
Hersbruck	148	148
Baden/Eifel/Rhineland-Palatinate	28	24
Total	30,686	30,920

only upon the quantity but also to a great extent upon how evenly it is distributed. A relative volume of only 62% of the 50-year precipitation mean for July was spread over 23 instead of the usual 14 days. The hop plants responded to this water supply with strong vegetative development which laid the foundation for a strong generative phase.

Unlike the months of June and July and the first week of August, the last two thirds of August were characterised by very little rainfall and extremely high temperatures which seriously affected crops in many places, especially on light soil. This heat shock disturbed cone development in the medium-late and late maturing varieties in particular and led to the formation of smaller cones. As a result, the crop volume and alpha contents anticipated in June and July could not be achieved.

Due to its lighter soils, the produc-

tion region around Spalt in particular suffered severe loss of yield as a result of the August heat wave.

The alpha content of the 1998 crop also failed to meet the expectations of the summer. Most of the varieties failed to equal the average of the last five years.

Hop logistics

Thanks to the financial support given to the hop growers by the partners in the processing plants Hopfenveredlung and Hopfen-Extraktion HVG Barth, Raiser & Co. for the purchase of a rectangular bale press, this ground-breaking form of packaging has been introduced widely in the last three years. Packing the hops in rectangular bales not only ensures storage and transport cost savings for the hop industry but also facilitates effective cold storage of the hops, thus maintaining their value and quality. In 1997, the year in which the standard-

continued on page 12

Alpha Acid Table

Variety	1994	1995	1996	1997	1998	Average
Hallertau Hersbruck	1.3%	2.1%	4.2%	4.3%	3.5%	3.1%
Hallertau Perle	3.3%	4.9%	7.8%	8.5%	6.2%	6.1%
Hallertau Spalt Select	2.2%	3.5%	5.5%	6.2%	5.3%	4.5%
Hallertau Hallertau Tradition	3.7%	4.5%	6.5%	6.4%	5.2%	5.3%
Hallertau Hallertau	2.6%	3.3%	5.3%	5.1%	4.6%	4.2%
Hallertau Northern Brewer	5.3%	7.1%	9.8%	9.9%	8.4%	8.1%
Hallertau Brewers Gold	3.7%	4.5%	7.1%	8.4%	7.0%	6.1%
Hallertau Hallertau Magnum	9.6%	11.1%	14.0%	15.7%	13.1%	12.7%
Hallertau Nugget	8.8%	8.8%	10.1%	12.5%	10.6%	10.2%
Hallertau Target	8.6%	9.9%	11.7%	12.5%	11.2%	10.8%
Hallertau Taurus	-	-	-	15.6%	13.4%	14.5%
Elbe-Saale Northern Brewer	4.5%	6.1%	8.6%	8.9%	7.9%	7.2%
Elbe-Saale Hallertau Magnum	9.2%	11.0%	14.3%	13.9%	12.5%	12.2%
Spalt Spalt	2.8%	3.3%	5.4%	5.2%	4.1%	4.2%
Tett nang Tett nang	2.9%	2.6%	4.6%	5.0%	3.8%	3.8%

All data in % as is, in accordance with EBC-Analytica 7.4. The values were measured in Oct./Nov. after the harvest. Appropriate deductions should be taken into account later in the course of season.

ized RB60 packaging unit (60-kilo rectangular bales measuring 60 cm x 60 cm x 120 cm) was introduced, more

than one quarter of Hallertau hops was packed in this form. This share increased in 1998, and more than one

third of all hops in the 1999 crop is expected to be packed in these packaging units.

Variety Development

Over the last five years the acreage of the main varieties in the German regions developed as follows:

Variety	1994	1995	1996	1997	1998
Hersbruck	5,485	4,956	4,104	3,104	2,408
Perle	3,591	3,705	3,889	3,985	3,623
Spalt Select	1,253	1,367	1,433	1,436	1,326
Hallertau Tradition	859	1,133	1,629	2,004	2,017
Hallertau	926	1,055	1,312	1,390	1,381
Spalt	183	165	168	186	190
Tett nang	1,057	1,061	1,094	1,102	1,070
Total main Aroma	13,354	13,442	13,629	13,207	12,015
Northern Brewer	4,821	4,313	3,588	2,962	2,286
Brewers Gold	1,316	1,140	823	505	236
Total main Bitter	6,137	5,453	4,411	3,467	2,522
Hallertau Magnum	1,317	1,850	2,379	2,984	3,388
Taurus	*	*	216	608	845
Nugget	503	668	724	776	699
Target	91	101	95	101	78
Total main High Alpha	1,911	2,619	3,414	4,469	5,010

* Acreage figures for the variety Taurus are not available before 1996.

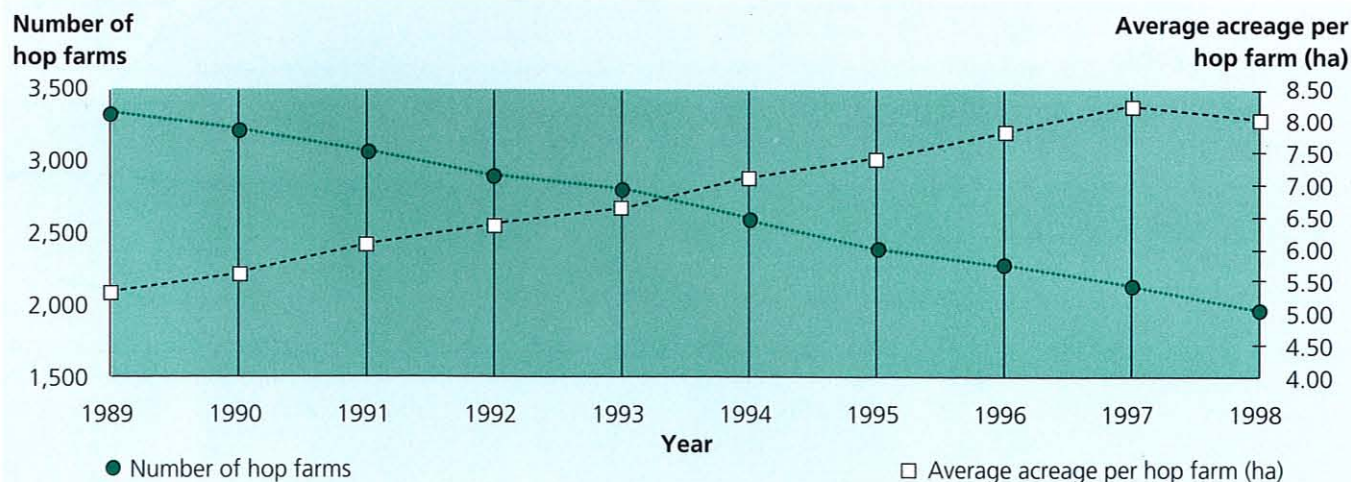
Structure of Hop Growing in Hallertau

As in the preceding years, the number of hop farms in Germany decreased further in 1998. While there were still 2,782 farms growing hops in 1997, the number fell by 235 to

2,547 in 1998. This development will continue in the years to come unless better prices can be earned.

The increasing size of hop farms on the one hand and their falling number on the other clearly show the structural change taking place in the Hal-

lertau region. 1998 was the first year, however, in which the average hop-growing acreage of the Hallertau hop farms actually decreased due to hop yards being taken out of production.



Market situation

Even before the harvest, it was clear to all concerned that the reduction in acreage compared with the

previous year (-1,699 ha) would make little impression on the brewing industry in view of its stockpiles of hops from the 1996 and 1997 crops. Since

the clearance of aroma varieties (-1,252 ha) and bitter varieties (-974 ha) was offset by expansion in high-alpha varieties (+1,088), crop expect-



Purchase prices at producer level in net DM per 50 kg in farmer's bales:

Area/Variety	Sep. 98	Oct. 98	Nov. 98	Dec. 98	Jan. 99
Hallertau Hersbruck	100	120	100	120	120
Hallertau Perle	120/150	150/130	110/130/160	160/200	200
Hallertau Hallertau Tradition	120	120	80	100/120	120
Hallertau Spalt Select	120	120	80	120	120
Hallertau Northern Brewer	140/150	150/140	140	200	200
Hallertau Hallertau Magnum	180/200/250	250	260/280/300	300	300
Hallertau Nugget	150/170/180	150/180	180/200	200	220
Hallertau Taurus	180/200/250	250	240/250/270	280/300	300
Tett nang Tett nang	400	400	400	400	-
Tett nang Hallertau	180/200	170	150	150	-
Spalt Spalt (small quantities)	-	450	410	450	-

tations in terms of tons of alpha acid were actually higher than in 1997. This development was expressed in a very low initial price level for the 1998 crop.

When the hop harvest began, it immediately became apparent that the production volume estimated for the Hallertau region in June and July would not be reached.

The first marketing activities on the German spot market could be observed while the harvest was still in progress. Prices ranged between 100 DM per 50 kg for **Hersbruck** and 180 DM per 50 kg for **Hallertau Magnum**. The market recovered to a certain extent in early September with **Perle** spots selling for 150 DM and **Hallertau Magnum** for 200 DM. All the hop trading houses were in the market, but turnover remained low.

At one point, on 12 September 1998, as rising prices caused some activity on the spot market, HVG Hallertau, the hop growers' association offered the Hallertau growers the chance, for a limited period up to 2 October 1998, to put all hop varieties into a spot hop pool.

On 16 September, in order not to be shut out of the spot hop market, Joh. Barth & Sohn started the so-called „Barth campaign” offering 20 DM per 50 kg above the official pool purchase price for **Northern Brewer**, **Brewers Gold**, **Hallertau Magnum**, **Taurus**, **Nugget**, **Target** and **Perle**. The Barth campaign further distinguished itself from the HVG pool by

paying a guaranteed minimum price on receipt of the hops. The following table shows the volumes that were

purchased in connection with the HVG pool and the Barth campaign.

Comparison of HVG pool and Barth campaign 1998 (mt)

Variety	HVG pool		Barth campaign
	actual	varieties of the Barth campaign	
Northern Brewer	300.40	300.40	188.05
Brewers Gold	42.35	42.35	31.25
Hallertau Magnum	194.15	194.15	68.25
Taurus	33.60	33.60	18.95
Nugget	71.75	71.75	77.00
Target	5.95	5.95	10.90
Perle	533.90	533.90	432.80
Hallertau	10.45	---	---
Hersbruck	247.15	---	---
Huell	4.65	---	---
Golding	0.80	---	---
Hallertau Tradition	800.00	---	---
Spalt Select	179.10	---	---
Hallertau Pure	3.00	---	---
Record	1.40	---	---
Orion	3.00	---	---
Trial varieties	0.75	---	---
Total	2,432.40	1,182.10	827.20

The HVG pool and the Barth campaign suggested to the market that there was a scarcity of hops. As there was hardly any demand on the part of the brewing industry, however, the competition on the purchasing side logically led to higher prices at producer level which could not be passed on to the brewing industry.

The activity on the spot market con-

tinued even after the HVG hop pool had closed and it was not until mid-November that the spot market slumped with lower prices for virtually all varieties. There was a certain recovery in late November and nearly all varieties were traded. The spot market was more or less cleared by the end of the year. Only negligible quantities were sold in the new year.

ENGLAND

Acreage and Production

Variety	Development of Acreage			Development of Production			
	1997	+/- Acreage ha	1998	1997 Ø-Yield mt/ha	1998	1997 Production mt	1998
Goldings	485	0	485	1.36	1.40	660.8	681.2
Fuggles	316	5	321	1.27	1.20	401.1	384.5
Challenger	288	-77	211	1.43	1.48	412.7	311.5
First Gold	161	1	162	0.96	0.98	154.5	159.2
Phoenix	179	-22	157	0.85	1.01	151.7	157.8
Progress	182	-61	121	1.69	1.48	308.1	178.7
W.G.V.	164	-53	111	1.42	1.45	232.7	161.3
Bramling Cross	50	-15	35	1.65	1.13	82.4	39.7
Total Aroma	1,825	-222	1,603	1.32	1.29	2,404.0	2,073.9
Northdown	312	-131	181	1.46	1.51	454.0	273.6
Total Bitter	312	-131	181	1.46	1.51	454.0	273.6
Target	864	-284	580	1.83	1.52	1,578.9	882.6
Herald	33	21	54	0.16	0.21	5.4	11.4
Admiral	16	2	18	1.04	1.23	16.7	22.2
Total High Alpha	913	-261	652	1.75	1.41	1,601.0	916.2
Others	17	-6	11	0.89	0.64	15.1	7.0
ENGLAND TOTAL	3,067	-620	2,447	1.46	1.34	4,474.1	3,270.7

In 1998, the significant reduction in acreage already anticipated the year before occurred, although not only among the aroma varieties – as had been expected – but among all variety groups. Altogether, there was a dramatic 20% reduction in acreage. If the recession in the world hop industry continues, the English hop industry will be in danger of losing its critical mass. A further disadvantage is that no suitable successor has yet been found for Target which is no longer internationally competitive in the high-alpha market.

Growth and quality

After heavy rainfall in the spring, the rest of the growing period was extremely dry. Due to exceptionally cold conditions, shoot development was late.

There were hardly any signs of disease or pests, and what minor infestation there was was easily kept under control by means of the pesticides available.

The weather conditions during the harvest were unfavourable, with a lot of wind and rain adversely affecting the optical quality of the hops. The alpha acid content, however, was generally high and was above the 10-year average for most varieties.

Alpha acid table

Variety	1997	1998
Goldings	5.9%	6.3%
Fuggles	4.9%	5.1%
Challenger	7.5%	7.7%
First Gold	8.9%	7.3%
Phoenix	10.8%	12.2%
Progress	6.2%	7.0%
W.G.V.	6.4%	6.6%
Bramling Cross	7.1%	6.4%
Northdown	8.6%	8.9%
Target	11.4%	11.3%
Herald	12.4%	11.9%
Admiral	13.9%	15.2%

All data in % as is, in accordance with EBC-Analytica 7.4. The values were measured in October/November after the harvest. Appropriate deductions should be taken into account later in the course of season.

Hop research

Three newly bred varieties were tested on farms in 1998 with varying degrees of success.

93/50 is an early-maturing variety with high yield potential for low trellis systems. It was grown on a large scale for the first time and produced up to 2 tons per hectare with an alpha content of 11.3%. The cost benefits of low trellis systems were also shown in the field trials. Initial brewing trials were successful, and, in 1999, the British Institute of Brewing is going to carry out commercial brewing trials.

P38, a high-alpha variety with high resistance to wilt, was successfully grown on four farms where serious wilt damage had occurred in other varieties in the past.

A new variety, **92/1**, was abandoned because shoot development was extremely late after a mild winter. In addition, it proved difficult to work with as a result of the uneven growth of the plants.

Market situation

90% of the crop had already been sold by contract. Apart from small quantities, the spot hops were also sold by early 1999.

The following average prices were paid:

Contract market	
Aroma	262 GBP per 50 kg (406 EUR)
Bitter/ High alpha	165 GBP per 50 kg (256 EUR)
Bitter/ High alpha	16,50 GBP per kg Alpha (25,60 EUR)
Spot market	
Aroma	175 GBP per 50 kg (272 EUR)
Bitter/ High alpha	100 GBP per 50 kg (155 EUR)
Bitter/ High alpha	10 GBP per kg Alpha (15,52 EUR)



FRANCE

Acreage and Production

Area	Variety Group	Development of Acreage			Development of Production			
		1997	+/-	1998	1997	1998	1997	1998
		Acreage ha			Ø-Yield mt/ha		Production mt	
Alsace	Aroma	696	37	733	1.47	1.57	1,020.0	1,148.5
	Bitter	13	2	15	2.07	2.12	26.9	31.8
	High Alpha	27	-6	21	1.90	2.10	51.4	44.2
	Total Alsace	736	33	769	1.49	1.59	1,098.3	1,224.5
Nord	Aroma	12	-2	10	0.75	1.31	9.0	13.1
	Bitter	13	-3	10	1.48	1.44	19.2	14.4
	High Alpha	13	-3	10	1.72	1.69	22.4	16.9
	Total North	38	-8	30	1.33	1.48	50.6	44.4
FRANCE TOTAL		774	25	799	1.48	1.59	1,148.9	1,268.9

In Alsace, the acreage of aroma varieties increased further in 1998, whereas in Northern France there was a slight decrease in acreage. The number of hop growers remained virtually unchanged year-on-year at 114.

Growth and quality

In 1998, as in the previous year, farming was made difficult by the weather conditions. Not only did the growers have to contend with frost,

wind, hail and storms, but the high temperatures in August also affected yields. Disease was limited, however, with the result that despite the adverse weather conditions the optical quality of the crop was rated as good to very good.

In Northern France, the weather conditions were better and the situation in general was described as satisfactory.

Alpha content, in general, was be-

low that of the previous year, with 2.6% (EBC 7.4) for **Strisselspalt**, the main variety in Alsace.

Market situation

98% of the 1998 crop had already been sold by forward contract and the small quantity remaining was sold on the spot market.

Forward contracts had already been closed for 91% of the projected 1999 crop by spring of this year.

SPAIN

Acreage and Production 1998

Variety	Acreage ha	Ø-Yield mt/ha	Production mt
H-3 Leonés	373	1.47	548.2
Total Bitter	373	1.47	548.2
Nugget	446	1.96	875.8
Magnum	7	1.66	11.6
Total High Alpha	453	1.96	887.4
Others	1	0.20	0.2
SPAIN TOTAL	827	1.74	1,435.8

As in the previous year, the actual hop acreage is estimated to be approx. 800 ha, considerably lower than the official figure. 8% of the total acreage is in the La Rioja region. The decline in acreage observed for some time now is likely to continue. Nevertheless, the crop production volume in 1998 was higher than in the years before, as the high-alpha varieties planted in recent years have now reached full yielding capacity. The proportion of high-alpha varieties

rose from 35% of the 1997 crop to 55% of the 1998 crop. This proportion is expected to rise further in the near future.

Growth and quality

The growing period was characterised by stable weather conditions. A mild winter was followed by a cool spring. The summer was hot, dry and extraordinarily long.

This led to earlier flowering and cone ripening than usual. There were

virtually no signs of disease or pests.

The average alpha acid contents (EBC 7.4) were slightly lower year-on-year for all varieties:

H-3	7.1 %
Nugget	10.8 %
Magnum	12.0 %

Market situation

The entire crop was sold to the Spanish brewing industry by forward contract and was processed into Type 90 pellets. Approx. one fifth of the pellet volume was further processed into CO2 extract.

As in the previous years, the average hop prices paid to the growers were as follows:

H-3	2.52 EUR/kg
Nugget/Magnum	3.31 EUR/kg

BELGIUM

Acreage and Production 1998

Variety Group	Acreage ha	Ø-Yield mt/ha	Production mt
Aroma	86	1.69	145.6
Bitter/High Alpha	176	2.24	394.2
BELGIUM TOTAL	262	2.06	539.8

The 14-percent year-on-year reduction in acreage was the greatest in recent years. Due to higher yields, however, production figures were only slightly below those of the previous year.

The crop consisted of the bitter/high-alpha varieties **Target** (142 ha), **Hallertau Magnum**, **Yeoman** and

Northern Brewer and the aroma varieties **Challenger** (58 ha), **Hallertau**, **Fuggles** and **Golding**.

Quality

The alpha contents recorded for **Target**, the main variety, and **Challenger** were 10.7% and 6.8% (EBC 7.4) respectively.

Market situation

Approx 16 tons of the production volume was left unsold. The average prices were:

Contract market	
Aroma	163 EUR/50 kg
Bitter/High alpha	210 EUR/50 kg
Spot market	
Aroma	87 EUR/50 kg
Bitter/High alpha	98 EUR/50 kg

By spring 1999, 63 tons of the 1999 crop and 26 tons of the 2000 crop had been sold by forward contract.

AUSTRIA

Acreage and Production 1998

Variety Group	Acreage ha	Ø-Yield mt/ha	Production mt
Mühlviertel	122	1.52	186.0
Leutschach	101	1.67	168.3
Waldviertel	22	1.36	30.0
AUSTRIA TOTAL	245	1.57	384.3

Mühlviertel/ Upper Austria

Weather conditions during the growing period were favourable for the hops and resulted in good organoleptic quality. The average alpha acid content was 7.8% (EBC 7.4). The main varieties are still the aroma varieties **Malling**, **Perle** and **Aurora**. **Perle** and **Tradition** are being planted as part of the variety conversion programme.

The major part of the crop produced by the region's 49 growers was sold to Austrian breweries at an aver-

age price of 4.51 EUR/kg. Only some 5% of the total had not been sold by spring 1999.

A reduction in acreage of approx. 7% is expected for 1999.

Leutschach/Steiermark

The weather conditions, above all the volume of precipitation, were ideal for the hops. Hail in early August caused only minor damage. The yields achieved by the 17 growers were very satisfactory, but the alpha acid values were lower than in 1997. The entire crop was sold to the region's brewing

industry by forward contract at an average price of 5.29 EUR/kg.

An 18-hectare reduction in acreage is expected for 1999. The main varieties will be the aroma varieties **Golding**, **Cicero** and **Celeja**.

Waldviertel/ Lower Austria

The practice of exclusively planting the **Zwettl Perle** variety in recent years was continued. The crop volume harvested by the 11 growers in the region was higher than in the previous year with good quality and an alpha content of 10 - 12%.

18 mt, or 60% of the crop was sold through forward contracts with a local brewery. The remaining 12 mt were sold on the spot market. The prices were 4.87 EUR/kg for grade I and 4.38 EUR/kg for grade II.

PORTUGAL

Year-on-year, acreage fell virtually by half from its 1997 level, leaving only 65 ha. A volume of 56 mt of **Nugget** was harvested, which means that the yield was only 0.86 mt/ha.

The average alpha content was 11.0% (EBC 7.4).

The entire crop was sold by forward contract, with an average price of 1.84 EUR/kg going to the growers.

A higher crop volume of approx. 85 mt is anticipated for 1999.



REST OF EUROPE

CZECH REPUBLIC

Acreage and Production

Area	Development of Acreage			Development of Production			
	1997	+/-	1998	1997	1998	1997	1998
	Acreage ha			Ø-Yield mt/ha		Production mt	
Zatec (Saaz)	5,640	-1,182	4,458	0.92	0.84	5,202.0	3,758.3
Ustek (Auscha)	936	-262	674	1.27	1.01	1,185.0	679.8
Trsice (Tirschitz)	875	-365	510	1.15	0.94	1,010.0	479.9
Others	15	0	15	0.93	0.82	14.0	12.3
CZECH REP. TOTAL	7,466	-1,809	5,657	0.99	0.87	7,411.0	4,930.3

As a result of the marketing difficulties in recent years, acreage reduction in 1998 was even greater than before. The year-on-year decrease was nearly 25%, while the fall in production volume was as much as 33%. A slight reduction in acreage is also expected for the current crop.

Growth and quality

Growth was affected by a very dry spring, with the result that many hop plants, especially in the Saaz region, hardly reached trellis height. Rainfall in June improved the situation, but was unable to prevent average yields

from being lower than in previous years. Cone ripening was accelerated by high temperatures, which led to the hop harvest commencing some three to five days earlier than usual.

In the Saaz region, the average alpha content (EBC 7.4) was 3.6%, in Auscha it was 3.5% and in Tirschitz 3.6%.

Market situation

As a result of a drop of about one third in production volume, 1998 saw none of the marketing problems that had characterised the years before. The 1998 crop is completely sold out.

In fact, the hops from previous crops stored by the Czech Republic's state fund for agricultural market regulation have also been sold entirely to domestic trading organisations. The production shortfall was made up for by the fact that numerous customers were oversubscribed with Saaz hops and were only too glad to accept a postponement of their contracts to later years. Prices on the spot market trebled from a pre-harvest price of approx. 67 EUR/50 kg to approx. 200 EUR/50kg.

The forward contract rate for 1999 is estimated to be about 85%.

POLAND

Acreage and Production

Variety Group	Development of Acreage			Development of Production			
	1997	+/-	1998	1997	1998	1997	1998
	Acreage ha			Ø-Yield mt/ha		Production mt	
Aroma	1,880	-400	1,480	1.20	0.91	2,250.0	1,350.0
Bitter	600	0	600	1.54	1.25	925.0	750.0
POLAND TOTAL	2,480	-400	2,080	1.28	1.01	3,175.0	2,100.0

One of the consequences of the difficult marketing situation was a reduction in acreage of more than 20% among aroma varieties. In addition, fewer bines per plant were strung on what acreage remained than in previous years, which in turn resulted in yields decreasing by more than 20% per hectare.

Growth and quality

Due to adverse weather conditions, completion of spring work was slightly delayed. Strong winds in June/July detached some of the hops from the

wires, which did not prove detrimental to the crop, however. Thanks to sufficient precipitation, the hops were ensured a plentiful supply of water throughout the entire growing period.

Aphid infestation was prevented by the use of the pesticide Confidor, and, due to the favourable weather conditions, there was no incidence of other pests or diseases. The organoleptic quality of the hops was described as very good. The average alpha acid yields (EBC 7.4) were 4.4% for the aroma varieties **Lublin** and **Lomik**

and 9.2% for the bitter varieties **Marynka** and **Northern Brewer**.

Market situation

The farmers were able to sell their entire crop. However, it is estimated that approx. 100 tons of hop products are still for sale on the market.

The forward contract rate for the coming year is estimated to be 75 - 85% - significantly higher than last year - although at least half of this is thought to have been contracted only in terms of quantity without a specified price.

SLOVENIA

Acreage and Production

Variety	Development of Acreage			Development of Production			
	1997	+/-	1998	1997	1998	1997	1998
	Acreage ha			Ø-Yield mt/ha		Production mt	
Aurora	1,230	-34	1,196	2.07	1.67	2,542.0	2,003.0
Styrian Golding	561	-49	512	1.44	1.15	809.0	588.0
Bobek	317	-100	217	1.62	1.83	513.0	397.0
Others	218	-133	85	1.51	1.91	330.0	162.0
SLOVENIA TOTAL	2,326	-316	2,010	1.80	1.57	4,194.0	3,150.0

Continuing the decline in acreage caused by marketing difficulties in recent years, the 13% drop was even more pronounced than expected. The number of growers also fell to 285.

Growth and quality

A mild and dry winter with an even distribution of rainfall was followed by a mainly dry spring with irregular rainfall. During the growing period, the mean temperature was above and

the precipitation level below the long-term average. Weather conditions in spring and summer were very changeable with occasional outbreaks of hail. Nevertheless, growth was average until August when a dry period was responsible for smaller cones and an earlier start to the harvest. The **Aurora** (Super Styrian) and **Styrian Golding** varieties were badly affected by the weather.

The average alpha values (EBC 7.4)

were 8.1% for **Aurora** (Super Styrian), 4.3% for **Styrian Golding** and 5.0% for **Bobek**.

Market situation

Only about 42% of the crop produced was sold by forward contract. Most of the spot hops were sold, however, at low prices of between 1.00 and 2.55 EUR/kg. In spring 1999 approx. 120 mt were still unsold.

SLOVAK REPUBLIC

Acreage and Production

Variety	Development of Acreage			Development of Production			
	1997	+/-	1998	1997	1998	1997	1998
	Acreage ha			Ø-Yield mt/ha		Production mt	
Saaz	777	-327	450	0.99	0.89	772.0	400.0
SLOVAK REP. TOTAL	777	-327	450	0.99	0.89	772.0	400.0

Due to marketing difficulties, acreage was reduced by more than 40% from the previous year's level.

Growth and quality

Weather conditions were more favourable than in the Czech Republic.

The higher temperatures and dry conditions affected hop development only to a slight degree. Alpha content was approx. 3.6% (EBC 7.4).

Market situation

As a result of production volume

declining by about half, the crop was sold almost completely. Since only aromatic hops are grown, however, the growers are still under pressure. Their market is limited to the domestic brewing industry and a small number of foreign buyers.

YUGOSLAVIA

Acreage and Production 1998

Variety Group	Acreage ha	Ø-Yield mt/ha	Production mt
Aroma	66	1.29	85.0
Bitter	374	1.40	525.0
Others	37	2.43	90.0
YUGOSLAVIA TOTAL	477	1.47	700.0

Growth and quality

Favourable weather gave rise to expectations of a record crop. However, hail seriously damaged almost

one third of the hop yards, dashing these hopes. The alpha content (EBC 7.4) of the aroma variety **Bačka** was quoted as only 0.9% (other sources

mention 1.5%) while the **Brewers Gold** bitter variety produced approx. 5.0%.

Growers tested two new aroma varieties.

Market situation

Overproduction and the resulting low prices, led to acreage reduction of nearly 20% from the level in 1997. According to unofficial sources, acreage was actually well below that.

80% of the crop had been sold at prices 2.05-2.55 EUR/kg by spring 1999.

BULGARIA

Acreage and Production 1998

Variety Group	Acreage ha	Ø-Yield mt/ha	Production mt
Aroma	90	0.74	67.0
Bitter	260	0.82	213.0
BULGARIA TOTAL	350	0.80	280.0

The decline in acreage continued with a slight year-on-year reduction, while yields remained virtually unchanged at a low level. The aroma varieties grown are **CFJ-8**, **Spalt**, **Wurtemberg** and **Perle**, the bitter varieties are **Nugget**, **Chinook**, **Olympic**, **Galena** and **Brewers Gold**.

The average alpha acid content (EBC 7.4) was 5.5% for the aroma and 9.0% for the bitter varieties, which was higher than in recent years.

The entire crop was sold to domestic breweries. At the time of going to press, no forward contracts had been closed for 1999.

TURKEY

Acreage and Production 1998

Variety Group	Acreage ha	Ø-Yield mt/ha	Production mt
Aroma	83	1.12	92.8
Bitter	201	0.53	105.7
TURKEY TOTAL	284	0.70	198.5

Brewers Gold remained the main variety (94% of bitter hop acreage). The acreage allotted to **Late Cluster** was reduced nearly by half. A new high-alpha variety called **Erciyas** was planted for the first time on approx. 1 ha. A decline in yield from previous levels was observed for all varieties.

The alpha content – even for aroma hops – averaged more than 9% (EBC 7.4).

The entire crop was sold to the Turkish brewing industry by forward contract. The average price per kilo of pellets was 4.60 - 5.10 EUR. Forward contracts have already been closed for the entire 1999 crop.

ROMANIA

The decline in acreage observed for several years continued in crop year 1998. It is estimated that only some 500 hectares producing approx. 225 tons remained. The average yield therefore also reached an all-time low of 0.45 tons per hectare.

There is still one large hop farm in operation with about 200 hectares, another with 50 hectares and some others with 20 - 25 hectares of hop

yards. All of these hop farms are in the region around Sighisoara and are former state farms (known today as „agroindustrial trading companies“).

The reasons for this dramatic decline in hop farming were explained in some detail in last year's hop report. They continue to be primarily marketing difficulties and financial problems.

SWITZERLAND

In 1998 acreage in Switzerland was 22 ha, a figure virtually unchanged in recent years. The crop volume was 46.4 mt which translates into an average yield of 2.10 mt/ha. This figure is average for Switzerland, but can be described as high by international standards. The varieties grown were **Hallertau**, **Perle** and **Magnum**.

All Swiss hop growers have changed over to integrated production in the meantime, with the exception of one grower who does organic farming.

Here, too, worldwide overproduction made itself felt, with the result that hop prices on the spot market were well below production costs.

RUSSIA

Acreage in Russia decreased by approx. 20% from the previous year's level to 1,330 hectares. The volume of hops harvested amounted to 624.3 tons, i.e. an average yield of only 0.47 tons per hectare. Of this acreage, 1,037 hectares with a production volume of 498.7 tons is located in the Chuvash hop growing region.

Due to the decline in value of the rouble, imports have become very expensive for the Russian brewing industry, which is leading to growing demand for domestic hops. For this reason an approximately 300-hectare increase in acreage is expected for 1999.

UKRAINE

No figures are available on hop farming in the Ukraine. Even the International Hop Growing Commission has been given no information since August 1998. Production estimates vary between 700 and 1,000 tons.

AMERICA

USA

Acreage and Production

Area	Variety	Development of Acreage			Development of Production			
		1997	+/-	1998	1997	1998	1997	1998
		Acreage ha			Ø-Yield mt/ha		Production mt	
Washington	Willamette	1,740	-152	1,588	1.69	1.32	2,943.2	2,099.2
	Cascade	420	-18	402	2.20	2.01	921.9	809.9
	Mount Hood	219	-73	146	1.48	1.15	323.3	168.6
	Perle	104	16	120	1.44	0.71	149.8	84.6
	Tettnang	633	-531	102	1.38	1.01	872.6	102.9
	Golding	65	-31	34	1.54	1.19	100.1	40.6
	Other Aroma*	85	17	102	1.66	0.98	140.8	99.8
	Total Aroma	3,266	-772	2,494	1.67	1.37	5,451.7	3,405.6
	Cluster	1,468	-413	1,055	2.11	2.14	3,091.3	2,256.9
	Other Bitter *	135	-17	118	1.62	1.58	219.1	186.7
	Total Bitter	1,603	-430	1,173	2.07	2.08	3,310.4	2,443.6
	Galena	2,819	-479	2,340	2.05	1.90	5,777.4	4,456.3
	Nugget	2,224	-283	1,941	2.30	1.69	5,106.9	3,282.9
	Columbus/Tomahawk	*	*	1,620	*	2.79	*	4,516.2
	Chinook	685	-277	408	2.04	1.75	1,396.8	712.6
	Olympic	51	0	51	2.22	1.85	113.2	94.3
	Other High Alpha *	1,456	-1,004	452	2.21	2.23	3,220.5	1,007.4
	Total High Alpha	7,235	-423	6,812	2.16	2.07	15,614.8	14,069.7
	Others *	483	-200	283	1.95	1.41	941.2	398.0
	Total Washington	12,587	-1,825	10,762	2.01	1.89	25,318.1	20,316.9
Oregon	Willamette	1,243	-316	927	1.64	1.70	2,043.5	1,575.4
	Perle	133	23	156	1.58	1.46	209.7	228.1
	Golding	99	-4	95	1.06	0.95	104.5	90.2
	Mount Hood	96	-5	91	1.85	1.69	177.6	154.1
	Fuggle	171	-94	77	1.04	1.22	177.5	93.7
	Tettnang	263	-201	62	1.00	1.33	262.0	82.2
	Total Aroma	2,005	-597	1,408	1.48	1.58	2,974.8	2,223.7
	Nugget	1,241	-263	978	2.40	2.26	2,980.2	2,211.4
	Total High Alpha	1,241	-263	978	2.40	2.26	2,980.2	2,211.4
	Others *	136	-27	109	1.48	1.87	201.4	204.0
Total Oregon	3,382	-887	2,495	1.82	1.86	6,156.4	4,639.1	
Idaho	Cluster	323	-57	266	2.20	1.51	710.7	402.0
	Total Bitter	323	-57	266	2.20	1.51	710.7	402.0
	Galena	270	27	297	1.76	1.37	476.3	406.3
	Chinook	139	17	156	2.00	1.48	277.6	230.2
	Total High Alpha	409	44	453	1.84	1.41	753.9	636.5
Others *	836	29	865	1.22	1.17	1,023.0	1,016.0	
Total Idaho	1,568	16	1,584	1.59	1.30	2,487.6	2,054.5	
Total Aroma	5,271	-1,369	3,902	1.60	1.44	8,426.5	5,629.3	
Total Bitter	1,926	-487	1,439	2.09	1.98	4,021.1	2,845.6	
Total High Alpha	8,885	-642	8,243	2.18	2.05	19,348.9	16,917.6	
Total Others	1,455	-198	1,257	1.49	1.29	2,165.6	1,618.0	
USA TOTAL	17,537	-2,696	14,841	1.94	1.82	33,962.1	27,010.5	

Minor statistical deviations may result from conversion of acres into ha and lbs into tons.

*Others include: **Washington:** Aquila, Banner, Eroica, Fuggle, Liberty, Northern Brewer

Oregon: Aquila, Banner, Cascade, Chinook, Cluster, Eroica, Galena

Idaho: Banner, Cascade, Mount Hood, Nugget, Olympic, Perle, Tettnang, Willamette

all states: proprietary varieties



Variety Development

The acreage of the main varieties in all of the US growing regions developed as follows:

Variety	1994 ha	1995 ha	1996 ha	1997 ha	1998 ha
Willamette	2,568	2,453	2,746	3,082	2,607
Cascade	540	457	423	420	402
Perle	226	162	167	237	276
Mount Hood	837	568	483	319	241
Tettnang	1,139	1,318	1,128	908	164
Total main Aroma	5,310	4,958	4,947	4,966	3,690
Cluster	2,480	2,418	2,295	1,795	1,321
Total main Bitter	2,480	2,418	2,295	1,795	1,321
Nugget	2,830	3,310	3,499	3,638	2,959
Galena	3,621	3,631	3,497	3,098	2,637
Columbus/Tomahawk	*	*	*	*	1,620
Chinook	1,075	1,084	1,044	816	563
Total main High Alpha	7,526	8,025	8,040	7,552	7,779

* Acreage figures for the variety Columbus/Tomahawk are not available before 1998.

Growth

Washington – The powdery mildew devastation of crop 1997 put into question many agronomic practices and caused much concern over individual operation's financial strength to fight this disease effectively. As a result, the growing community pulled together and collectively invited powdery mildew experts from around the world to share their experiences through seminars and via the internet. In addition, the industry held regular district powdery mildew meetings, posted sightings of initial infections (flag shoots) on the Hopnet, the industry's electronic bulletin board, and hired scouts to remove wild hops from irrigation ditches and along roadsides. It was clear, however, that growers would still have a difficult fight should weather patterns favour the spread of the disease, as chemicals cleared for use during the 1998 growing season were not highly effective and had similar modes of action.

As opposed to the previous winter, precipitation was limited to the mountains, leaving fields free of a protective snow blanket. This allowed the occasional cold spell in the otherwise mild winter to penetrate the ground and kill some of the left-over powdery mildew spores. To contain the disease from the start, growers started pruning earlier and repeated it at higher than normal frequencies.

By June, the high spring moisture coupled with warmer and subsequent cooler than normal temperatures had left the crop growing very unevenly. In addition, powdery mildew was sighted in super high alpha varieties that were previously thought to be tolerant.

By mid-July temperatures turned extremely hot with days approaching 40°C. This heat wave lasted through most of August with only minor interruptions and stressed plants during bloom and cone development. Vines were subjected to further stress by the up to 10 additional powdery mildew spray applications. Ultimately, the modified management practices for crop 1998 combined with the prolonged heat wave resulted in a yield reduction of approx. 16% or 4,000 tons for this state compared to normal production expectations.

Oregon – Autumn and winter were cool with higher than normal precipitation. By mid-April, however, temperatures began to warm up, allowing for regular spring work to commence with the application of necessary preventative fungicides. Throughout May and June, the hops developed normally and it appeared that the season would proceed rather uneventfully.

On July 23, powdery mildew was discovered for the first time in a yard in Oregon, only two weeks after it had

been found in Idaho. Like in Idaho, growers in Oregon were prepared for the disease and immediately applied preventative control measures. Although the disease subsequently spread to other yards, damage was insignificant.

Weather conditions throughout the rest of the season were favorable for the growth of **Nugget** which achieved its long-term average yields. Growth of aroma varieties were mixed, with **Willamette** and **Tettnang** realizing better than average yields, while **Perle**, **Golding** and **Mt. Hood** produced poor yields.

Idaho – Winter precipitation brought a sufficient snow pack in the mountains assuring adequate water supplies throughout the season. Temperatures followed a similar pattern as in Washington, resulting in the varieties trained later lagging in growth throughout most of the season.

In the first week of July, powdery mildew was found in a **Galena** hop yard and subsequently in other yards in both Southern and Northern Idaho. Control agents used in Washington were already cleared for use in this state and applied instantly. The immediate treatment of hop yards contained the disease and only occasional cone damage was detected at harvest.

Much like in Washington, however,

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a heat wave prevented adequate cone development in this state, too. High alpha varieties yielded lower by approx. 25%, reducing the total crop by 225 tons.

Quality

The overall appearance of the 1998 crop was good. The average US leaf and stem content dropped to 0.12%, its lowest level ever. However, part of this achievement may be due to a change in analysis method that now

more closely compares to the European method. The average seed content, after jumping to 1.15% in 1997, again declined to 0.54% and was in line with the long-term trend of improving seed content. Physical appearance was much more consistent than last year, as the damaging effects of powdery mildew were contained. Due to the prolonged heat wave in Washington, mite populations exploded in some hop yards and damaged the occasional lot of hops.

Both Washington and Idaho high alpha varieties produced lower than expected alpha levels. This was especially evident in the **super alpha** and **Nugget** varieties, which were up to one percentage point lower. In total, the US crop produced only an estimated 2,630 tons alpha or approx. 500 tons less than the previous year.

Alpha acid table

Alpha acid contents of the main American varieties from 1994 - 1998:

Variety	1994	1995	1996	1997	1998	Average
Willamette	3.6%	4.0%	3.8%	3.8%	4.2%	3.9%
Tettnang	3.1%	3.2%	3.8%	3.8%	3.4%	3.5%
Mount Hood	3.4%	3.2%	3.9%	4.3%	4.0%	3.7%
Cascade	4.1%	3.8%	5.4%	5.0%	4.9%	4.6%
Cluster	6.4%	6.2%	6.3%	6.4%	6.5%	6.4%
Galena	11.3%	10.6%	11.4%	10.6%	11.7%	11.1%
Nugget	12.4%	11.3%	12.6%	12.0%	12.3%	12.1%
Chinook	10.4%	10.4%	11.0%	10.3%	11.0%	10.6%

All data were converted from ASBC spectrophotometric (at time of harvest) into % as is according to EBC-Analytica 7.4. (Oct./Nov. after the harvest) to ensure comparability within this report.

Spot Market

While crop reports up to mid-September still projected above-average yields in Germany, reports from the US already predicted one of the poorest harvests in recent history. Estimated spot quantities, originally calculated in spring to be 4,500 tons, evaporated as harvest estimates came closer to the actual production of only 27,000 tons. This translated in a theoretical shortfall in production of 1,000 tons compared to the contracted quantity of 28,000 tons, as per the USDA „sold ahead survey“. Thus, growers throughout harvest were less concerned with selling their spots than with fulfilling their existing contracts.

The small spot quantities were held by few growers and in each case limited to a few hundred bales. This made the development of a spot market difficult. Nevertheless, some transactions occurred, starting with **Willamette**, which sold at USD 2.00 and USD 2.05 per pound plus premiums. A price of USD 2.00 per pound for **Mt. Hood** cleaned up the few available spots. While larger quantities of **Cluster** existed, the lack of demand for this variety resulted in not all spots finding a buyer and those that did only achieved a price of USD 1.15 per pound.

By late September, most growers had finished with their harvest. The

shock of the disastrous crop and lower alphas initially delayed the development of a spot market for the few spot high alphas. Only when it became evident that Germany had not produced another record crop with record alphas did interest return to US alpha varieties. A short-lived **Nugget** market in Oregon, the only state that produced a normal high alpha crop, cleared all remaining spots at USD 1.25 per pound. Subsequent sales of **super high alpha** varieties commanded prices of up to USD 1.40 per pound plus premiums. Quantities, however, remained insignificant.

Contract Market

Between spring of 1998 and spring of 1999, US growers signed new contracts for crop 1999 totaling approx. 4,000 tons. Although this rate is slightly higher than the typical additional quantity sold within one year

for the upcoming crop, the total 1999 crop volume contracted is 24,117 tons, which is still approx. 4,000 tons lower than the same period last year and approx. 6,000 tons lower than in the last four years. In these years, typical contracted quantities for the

upcoming crop were typically around 30,000 tons.

Based on an estimated production of 27,200 tons for crop 1999, growers hold forward contracts covering 89% of their production, which is in line with historical averages. However,



Quantities Contracted Forward (in mt)

Report as of Spring	same Crop Year	Years forward				
		1 Year	2 Years	3 Years	4 Years	5 Years
1999	24,117	18,551	12,651	9,698	2,958	2,451
1998	27,844	19,237	15,896	9,172	2,915	1,767
1997	31,343	28,395	20,321	16,511	5,171	4,581
1996	30,073	28,486	22,498	13,653	9,117	3,765
1995	30,844	27,034	18,552	15,150	6,713	4,581
1994	33,022	30,935	21,274	17,146	14,560	7,756

Degree of Forward Contracting (in %)

1999	89%	68%	46%	36%	11%	9%
Ø 1994-98	91%	84%	67%	51%	28%	18%

contract coverage in subsequent years is 15 to 20 percentage points below historical forward coverage.

Most of the forward contract activity focused on **super high alpha** varieties or generic alpha. Prices for crop 1999 have ranged between a low of USD 1.05 to a high of USD 1.25 per pound plus premiums at various times throughout the year. Subsequent years typically saw an increase in price of USD 0.05 per pound per

year. Other high alpha varieties, such as **Nugget** were also forward contracted, but typically only one to two years. Prices for this variety in 1999 ranged between USD 1.30 to USD 1.40 plus premiums, while **Galena** sold 5 to 10 cents higher for the same periods. In some cases, alpha premiums were given, typically starting at 12.5% for **Galena**, 13.0 to 13.5% for **Nugget** and 16.0 to 16.5% for super alpha varieties. (Values given in

ASBC Spectro; comparable values within this report are 10% lower.)

Most aroma contracting activity centered on the varieties **Willamette** and **Perle**, and was dominated by the direct purchasing programs of two breweries. **Willamette** was purchased at USD 2.35 and USD 2.40 for 1999 and 2000, while **Perle** was bought at 3.05 per pound plus premiums for crop 2000.

Financial Aspects of the Industry

The season average price rose slightly for the first time in four years, from USD 3.53 in 1997 to USD 3.57 per kg in 1998. This increase, however, did not translate into increased profits or revenues for growers. On the contrary, the total farm gate value of crop 1998 dropped by approximately USD 23 million from the prior year to an estimated USD 97 million in 1998, resulting in a revenue decline per hectare of approx. USD 220 to USD 6,620.

Due to the increased expense of fighting powdery mildew, overall production costs have increased by approx. 10% and are now estimated at USD 8,400 per hectare (post-harvest 1998 Hop Growers of America survey). Based on these estimated production costs and revenues, the average US growers lost approx. USD 1,800 per hectare.

Although the performance of individual operations varied, the magnitude of the average loss has been so great that it is likely that most operations

incurred losses, some of them severe. To cover these losses, many operations had to refinance their 1998 shortfall with long-term loans which will burden future crops with higher costs for interest charges and debt repayments. As a result the future viability of some operations has been severely impaired and it is expected that up to 10% of the growers will not be able to farm crop 2000.

Estimate Revenue per Hectare (in USD)

	1993	1994	1995	1996	1997	1998	Ø
Washington	8,000	7,867	8,007	7,323	7,100	6,664	7,494
Oregon	7,222	8,299	7,481	6,181	6,735	7,301	7,203
Idaho *	7,790	8,760	6,941	6,644	6,177	4,632	6,824
USA TOTAL	7,844	8,007	7,830	7,052	6,837	6,620	7,365

* excludes revenue for "other aroma varieties" mostly grown in Northern Idaho

Average Prices per kg (in USD)

Washington	3.79	3.85	3.70	3.59	3.53	3.53	3.66
Oregon	4.23	4.32	4.19	3.99	3.70	3.92	4.06
Idaho	3.90	3.95	3.55	3.28	3.10	3.35	3.52
USA TOTAL	3.88	3.99	3.77	3.63	3.53	3.57	3.73

ASIA

CHINA

Acreage and Production

Area	Development of Acreage			Development of Production			
	1997	+/-	1998	1997	1998	1997	1998
	Acreage ha			Ø-Yield mt/ha		Production mt	
Xinjiang	2,516	0	2,516	2.78	2.86	7,000.0	7,200.0
Gansu	1,668	-58	1,610	2.55	2.80	4,252.0	4,507.0
Ningxia	50	0	50	2.40	2.40	120.0	120.0
Others	100	0	100	2.30	2.30	230.0	230.0
CHINA TOTAL	4,334	-58	4,276	2.68	2.82	11,602.0	12,057.0

After having been reduced by about one quarter from 1996 to 1997, acreage remained virtually unchanged in 1998.

The main variety grown is **Qingdao Flower 641**. The other varieties are **Kirin-4, Marco Polo (Columbus), Sapporo-1, Cascade** and **Hallertau**.

Growth and quality

Both in Xinjiang and Gansu, the growing period was marked by exceptionally plentiful precipitation, thus ensuring a sufficient supply of water for the hops. There were hardly any signs of disease or pests apart from red spider mite in the north of Xinjiang.

Market situation

In the meantime, some 40% of the crop is marketed in the form of hop products by the trade which has grown up in the last five years. Only about 60% still goes directly from the farms to the breweries.

The average price paid to the farms for hops with alpha content of 6.5% was RMB 17,000 (EUR 1,985) per ton.

JAPAN

Acreage and Production

Brewing Group	Development of Acreage			Development of Production			
	1997	+/-	1998	1997	1998	1997	1998
	Acreage ha			Ø-Yield mt/ha		Production mt	
Kirin	257	-27	230	1.79	1.63	460.0	375.1
Sapporo	104	-5	99	2.21	1.88	229.6	185.8
Asahi	34	-6	28	1.99	1.93	67.7	53.9
Suntory	3	0	3	1.70	1.27	5.1	3.8
JAPAN TOTAL	398	-38	360	1.92	1.72	762.4	618.6

The constant decline in acreage and in the number of hop farms over a period of more than 10 years continued. In 1998 there were 603 hop farms left. Due to the weather conditions, the average yield per ha in 1998 was some 10% below yields in recent years.

The hops grown were the Japanese bitter varieties **Shinsyu Wase, Furano Ace** and **Kirin No. 2**.

Growth and quality

High temperatures and dry conditions predominated throughout the spring. The rest of the growing period was characterised by repeated outbreaks of heavy rain. These weather conditions resulted in powdery and downy mildew affecting some regions.

The alpha acid content (converted into EBC 7.4) averaged approx. 6.8%.

Market situation

There is no spot market in Japan, as hops are only grown by farmers who have contracts with the breweries for specific acreages over a period of several years.

93% of the crop was classed as quality grade I. The purchase prices paid by the breweries were 2,067 JPY/kg (16.44 EUR) for grade I, 1,965 JPY/kg (15.63 EUR) for grade II and 1,552 JPY/kg (12.35 EUR) for grade III.

1999 CROP

AMERICA

ARGENTINA

Acreage and Production

Area	Variety	Development of Acreage			Development of Production			
		1998	+/-	1999	1998	1999	1998	1999
		Acreage ha			Ø-Yield mt/ha		Production mt	
Bolsón	Cascade	124	-10	114	1.23	1.22	153.0	139.0
	Others	7	-3	4	0.86	1.68	6.0	6.7
	Total Bolsón	131	-13	118	1.21	1.23	159.0	145.7
Alto Valle	Mapuche	10	6	16	1.30	1.45	13.0	23.2
	Traful	3	4	7	1.67	1.29	5.0	9.0
	Others	23	-12	11	0.74	1.37	17.0	15.1
	Total Alto Valle	36	-2	34	0.97	1.39	35.0	47.3
ARGENTINA TOTAL		167	-15	152	1.16	1.27	194.0	193.0

Hops are grown on one farm in the Alto Valle region and on thirteen farms in the El Bolsón region.

Growth and quality

The temperatures during the growth phase were much higher than usual,

particularly during the summer months of January and February. The lasting hot and dry conditions caused severe red spider mite infestation, which adversely effected the hops' optical quality.

The alpha content of the main variety, **Cascade**, (converted to EBC 7.4) was approx. 5.5%.

Market situation

The entire production volume was sold to the domestic brewing industry.

AFRICA

SOUTH AFRICA

Acreage and Production

Variety	Development of Acreage			Development of Production				
	1998	+/-	1999	1998	1999	1998	1999	
		Acreage ha			Ø-Yield mt/ha		Production mt	
Southern Brewer	553	-156	397	1.64	1.73	907.0	688.0	
Outeniqua	38	40	78	0.87	1.26	33.0	98.0	
Southern Promise	10	6	16	1.50	2.19	15.0	35.0	
SOUTH AFRICA TOTAL	601	-110	491	1.59	1.67	955.0	821.0	

In South Africa, too, acreage was sharply reduced from the previous year of harvest. 42 ha of the area planted with **Outeniqua** consisted of young hops in their first year, and the resulting yield and alpha content were generally lower than is expected for the future.

Growth and quality

A mild winter was followed by ex-

tremely dry conditions during the growing period, causing several reservoirs to dry out. Although irrigation equipment is installed in all the hop yards, the severe drought had an adverse effect both on yields and on alpha acid values. If there is not sufficient rainfall by November, there is a risk of the drought affecting the next crop, too.

Alpha figures (EBC 7.4) were 9.6%

for **Southern Brewer**, 12.6% for **Outeniqua** and 10.8% for **Southern Promise**.

Market situation

As in the past, the entire crop volume was sold to South African breweries by forward contract. The average price for all three varieties was 20.50 rand/kg (3.10 EUR).

AUSTRALIA – OCEANIA

AUSTRALIA

Acreage and Production

Area	Variety	Development of Acreage			Development of Production			
		1998	+/-	1999	1998	1999	1998	1999
		Acreage ha			Ø-Yield mt/ha		Production mt	
Tasmania	Aroma	34	-30	4	1.09	1.65	37.0	6.6
	Pride of Ringwood	267	39	306	2.81	2.69	750.0	823.7
	Victoria (Pride of Ringwood)	50	88	138	2.76	3.00	138.0	414.0
	Nugget	56	18	74	2.91	2.56	163.0	189.3
	Opal	38	20	58	3.03	2.02	115.0	116.9
	Super Pride	*	*	8	*	0.89	*	7.1
	Other High Alpha	*	*	25	*	2.16	*	54.0
	Total High Alpha	144	159	303	2.89	2.58	416.0	781.3
	Others	17	-6	11	1.59	1.52	27.0	16.7
	Total Tasmania	462	162	624	2.66	2.61	1,230.0	1,628.3
Victoria	Pride of Ringwood	68	16	84	2.65	2.41	180.0	202.7
	Cluster	14	2	16	1.86	1.66	26.0	26.5
	Total Bitter	82	18	100	2.51	2.29	206.0	229.2
	Victoria	34	60	94	3.21	3.13	109.0	294.1
	Super Pride	*	*	8	*	2.94	*	23.5
	Other High Alpha	26	-10	16	0.46	3.93	12.0	62.8
	Total High Alpha	60	58	118	2.02	3.22	121.0	380.4
	Total Victoria	142	76	218	2.30	2.80	327.0	609.6
Total Aroma	34	-30	4	1.09	1.65	37.0	6.6	
Total Bitter	349	57	406	2.74	2.59	956.0	1,052.9	
Total High Alpha	204	217	421	2.63	2.76	537.0	1,161.7	
Total Others	17	-6	11	1.59	1.52	27.0	16.7	
AUSTRALIA TOTAL	604	238	842	2.58	2.66	1,557.0	2,237.9	

* Included in "Others".

Crop volume in Australia rose year-on-year by nearly 700 mt, as the acreage idled in 1999 was only 180 ha, compared with 450 ha in 1998. The plants idled the year before and re-strung for this year grew well and produced good yields in most cases. On some farms, this break proved to be advantageous, as the hops were noticeably stronger than before.

Alpha Acid Table

Variety	1998	1999
Pride of Ringwood	9.3%	9.9%
Cluster (Vic.)	6.0%	6.8%
Victoria	13.0%	13.8%
Nugget (Tas.)	11.7%	10.8%
Opal (Tas.)	11.6%	11.7%
Super Pride	14.1%	14.1%

All data for pellets in % as is, in accordance with EBC-Analytica 7.4. The values were measured in March/April after the harvest. Appropriate deductions should be taken into account later in the course of season.

Growth and quality

There were marked variations in crop yields among the individual hop regions in Australia.

The Victoria region recovered well from the long drought that had affected the previous crop and from the floods in September 1998. The high-alpha variety, **Victoria**, which now accounts for nearly 50% of the crop in the State of Victoria achieved an alpha yield (in pellet form) of 480 kg/ha.

In South Tasmania the summer was warm with more rainfall than usual. The yields were very good, the alpha contents average. In Northwest Tasmania, growth was held back initially by cold weather. The crop did not recover from this setback and both yields and alpha contents were the lowest in years. The hops in Northeast Tasmania, on the other hand, had good yields and excellent alpha values.

New variety

T7, the new variety already mentioned in last year's report, has been renamed **Super Pride**. On the basis of positive experience so far, the acreage to be planted with this variety next year is being increased to approx. 100 ha. The first sizeable quantities are expected to be on the market by 2001.

Market situation

The growers' confidence in the spot market was still slight, with the result that they almost only strung hops which had already been sold by forward contract.

By mid-May 1999, only 50 mt was still available on the spot market.



NEW ZEALAND

Production

Variety	1998/mt	1999/mt
NZ Hallertau Aroma	206.4	201.2
NZ Pacific Hallertau	24.6	54.8
Total Aroma	231.0	256.0
NZ Super Alpha	186.2	193.4
NZ Pacific Gem	145.8	188.0
NZ Green Bullet	56.0	70.4
NZ Sticklebract	9.9	13.9
NZ Southern Cross	13.4	16.0
Total High Alpha	411.3	481.7
Trial Varieties	2.1	2.8
NEW ZEALAND TOTAL	644.4	740.5

Currently there are 22 hop farms in New Zealand. There was a slight year-on-year rise in acreage to 360 ha of which 155 ha was strung with aromatic varieties.

Growth and quality

A very wet spring was followed by exceptionally dry weather conditions during the growth phase. As it was possible to irrigate the hop yards constantly, however, a good crop developed with excellent alpha levels in the bitter and high-alpha varieties. Inex-

plicably, the aroma varieties had lower alpha levels than usual.

The average individual alpha acid contents (EBC 7.4) were as follows:

NZ Hallertau Aroma	8,2 %
NZ Pacific Hallertau	5,0 %
NZ Super Alpha	13,6 %
NZ Pacific Gem	16,0 %
NZ Green Bullet	14,1 %
NZ Sticklebract	14,3 %
NZ Southern Cross	14,0 %

Market situation

The greater part of the crop was sold at harvest time, with demand for organic hops greatly exceeding supply in 1999. At the time of going to press, only small quantities of most varieties remained unsold.

PLANT DEVELOPMENT 1999

Germany

While precipitation was abundant in the autumn months, it was well below the long-term average in the winter and spring months of 1999. Winter began early with exceptionally low temperatures in November, but was briefly interrupted by unusually high average temperatures in January and came to an end with a cold February. Because of a long-lasting snow blanket, the ground was not loosened by frost.

Higher average monthly temperatures and evenly distributed rainfall in March, April and May helped the hop crop to develop quickly and resulted in above-average crop development which was unaffected by lower temperatures in June.

The present state of the hop plants is a very good basis for optimum fur-

ther development which greatly depends, however, on the weather conditions in July and August, the most important months for qualitative and quantitative development.

Of the annually recurring pests and diseases, the early appearance of mildew due to the weather conditions is worthy of mention. Control measures are being taken with success.

Acreage has been reduced by some 1,383 hectares, or 7%, to approx. 18,300 hectares from last year's level.

USA

Winter brought sufficient precipitation to replenish reservoirs, assuring an adequate water supply for crop 1999. While cooler than normal temperatures have slowed plant growth in Washington, periods of dry weather in Oregon have allowed the crop to deve-

lop vigorously and relatively free of downy mildew. In early spring, powdery mildew appeared only sporadically in Washington, but has since been found in all states. Although levels of infection vary, super high alpha varieties seem to be most sensitive at this time.

In June, the USDA released its acreage survey and reported that the US production area declined by 972 hectares to 13,857 hectares. Based on this data and on historical yields, the US production is estimated at approx. 29,000 tons of hops containing 3,000 tons of alpha. However, the total production could be greater if powdery mildew does not reduce the crop results, as growers planted more than 150 hectares of super high alpha varieties after the USDA had finalized its acreage survey.

OUTLOOK 1999

The global trend towards further reductions in acreage is continuing. The supply of hops in the coming year

will probably correspond very closely with demand. Further overproduction is improbable, but significant stocks

remain in the hands of some brewers and growers.



THE STRUCTURAL CRISIS IN THE INTERNATIONAL HOP INDUSTRY

The financial effects of crop year 1998, with the unfortunate combination worldwide of sharply falling demand and production-related losses, are such that growers in many hop regions and what remains of the hop trade and its processing plants are faced with significant problems.

Since 1993, hop growing has experienced an overproduction crisis which has resulted in considerable loss of capital. In crop year 1998 alone, the losses of the American growers were calculated to be 23 million dollars. Similar losses can be assumed for the European hop growers.

The brewing industry is also in a difficult position. The end-consumer markets in countries like the USA, Western Europe and Japan have long been saturated, which is reflected in only minor growth or even declining beer output. The recent growth markets in Latin America and Asia have been affected by last year's currency and finance crisis. As a result of increasingly tough competition and the need to cut costs, the world's

major brewing groups regard international expansion as the main opportunity for growth. They have developed from domestic beer producers to marketers of international beer brands. This process of concentration and the accompanying structural change in the industry had the consequence for the hop industry that in 1998 around two-thirds of world hop demand came from only 50 brewing groups.

The introduction of free market systems during the past decade, accompanied by intense competition on a global scale and the resulting necessity to launch new products more quickly and more frequently, has changed the attitude of the brewing industry to their hop suppliers. Most of the major brewers use new brewing technologies at all stages of production. They demand ideas, cooperation and innovation from their suppliers. Individual understanding for the fate of national or even local hop regions no longer exists. Competitiveness is the sole criterion when it comes to choosing among different growing regions, varieties and hop products.

Breeding successes in the form of new hop varieties and the development of new hop products in the past decade have resulted in the cost of raw hops per hectolitre decreasing to the advantage of the brewing industry. In order to make this possible, the hop industry has had to make considerable investments. The present phase of overproduction of hops can be seen as a direct consequence which, in turn, is forcing growers to reduce acreage or even to go out of business as well as causing concentration in the hop marketing and sales industry.

The attitude of the brewing industry is ambivalent. On the one hand, they welcome diversity in the hop market and emphasise their interest in a healthy hop industry. On the other hand, their purchasing behaviour encourages cost-saving mergers, so that - wherever possible - economies of scale can be made use of all along the supply chain.

Source material from all over the world was required to publish this report.
We would like to thank all those who supported us with their information.