

Research subject on hop

Saaz, Semptember 18, 2008



1. The situation during the Crop Year and the quality

A. Development of the weather and the situation in production 2008

At the enclosure please find the monthly Hop Reports 2008, regularly published on the web sites of Bohemia Hop, a.s. Žatec - www.bohemiahop.cz. Tables No. 1 and No. 2 indicate summarized data concerning the whole vegetation period (April – August) in 2008, compared to the same period of 2007 and long-term average covering the period of 1961 to 1990.

Table No. 1 – Temperature (°C)

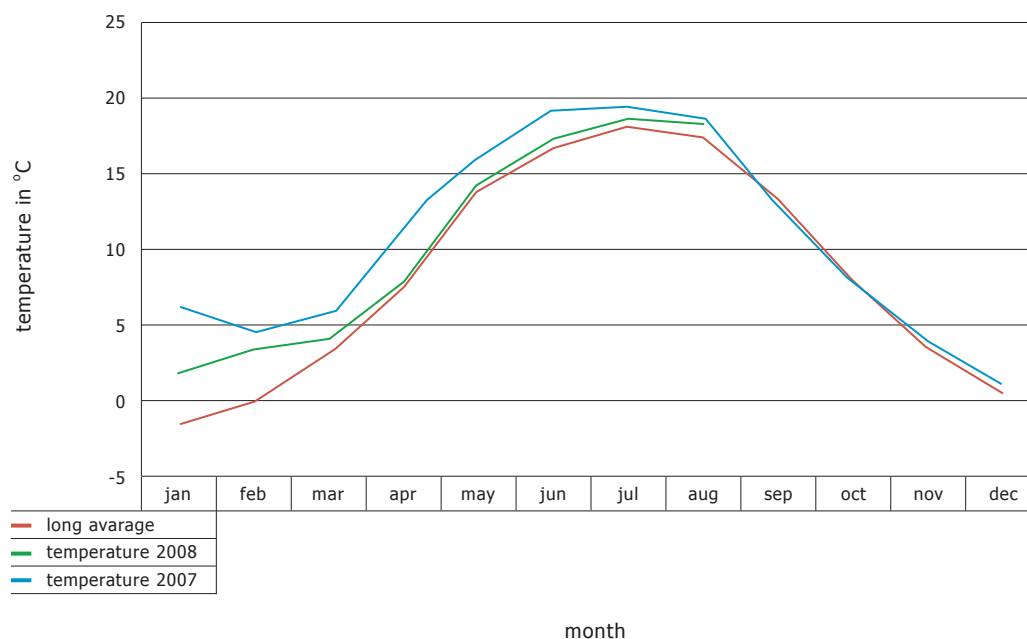
Month	average temperature °C		difference + -	30-years average °C	difference + -
	2008	2007			
April	8,80	12,80	- 4,00	8,50	+ 0,30
May	13,90	15,80	- 1,90	13,40	+ 0,50
June	17,90	19,60	- 1,70	16,70	+ 1,20
July	18,20	19,50	- 1,30	18,00	+ 0,20
August	18,30	18,90	- 0,60	17,40	+ 0,90
Total	77,10	86,60	- 9,50	74,00	+ 3,10

Table No. 2 – Precipitations (mm)

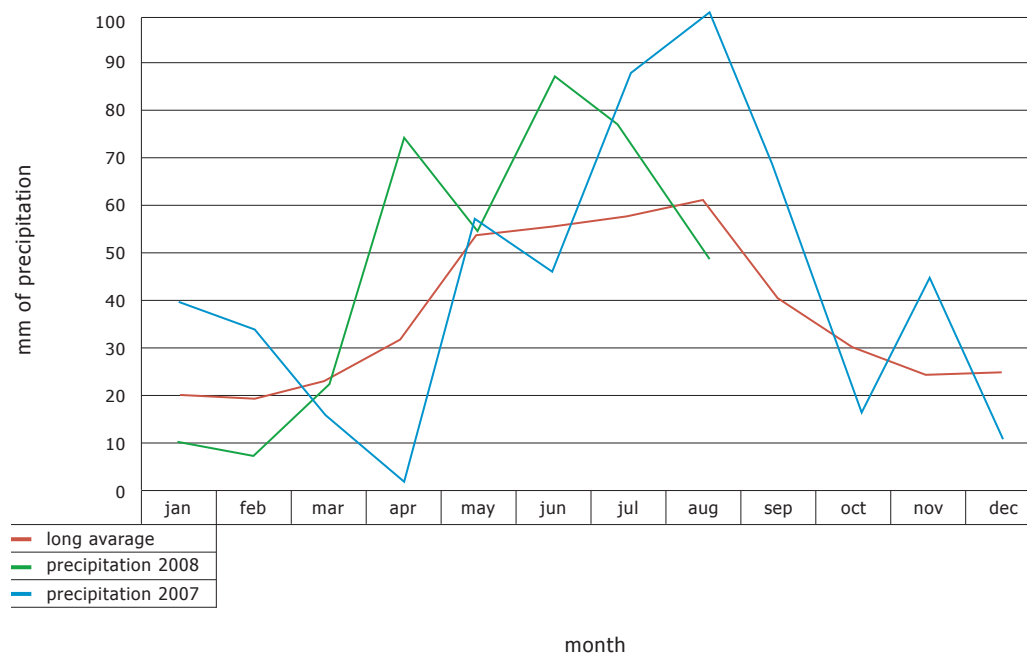
Month	Total precip. per month (mm)		difference + -	30-years average mm	difference + -
	2008	2007			
April	74,80	2,10	+72,70	32,00	+ 42,80
May	54,40	57,00	- 2,60	54,00	+ 0,40
June	87,00	51,60	+35,40	56,00	+ 31,00
July	77,20	87,40	- 10,20	59,00	+ 18,20
August	48,80	102,20	- 53,40	62,00	- 13,20
Total	342,20	300,30	+ 41,90	263,00	+ 79,20

The data indicated above are accompanied by Graphs showing the average temperatures and the total of the precipitations per month, covering period of January to August 2008.

Graph No. 1 – Average temperatures



Graph No. 2 – Precipitations per month



The precipitations of first two months of 2008 were deeply below the long-term average. It nevertheless improved in March and particularly in April 2008, when - especially within the last mentioned month - the shortage of moisture, originated in the course of previous period, was fully covered. The development of temperatures during the first trimester proved to be more favourable than in the same period of preceding years, and even when the chart curve, showing the monthly average temperatures, was moving over the long-term average, the extremely high temperatures did not occur. The temperatures as well as the precipitations of May corresponded to ones of long-term average, what is rather rare phenomenon.

Unfortunately the rainfalls were concentrated into two relatively short periods, the second rainy period having had a stormy character with occurrence of hails. Within these period approximately 200 hectares of hop gardens were damaged, of it about 100 hectares were destroyed 80 to 100 %. The calamity affected mostly the localities of Lišany and Postoloprty. The rainstorms and hailstorms than annoyed the farmers also in June. The hailstorm totally destroyed about 10 hectares of hop gardens immediately on the 1st of June 2008, and further approx. 100 hectares were partially damaged. Another harm occurred on 25th of June 2008, when four hectares of hop constructions have fallen down and further 130 hectares were damaged by hailstorm. The localities in question were Lhoťa pod Džbánem, Velká Třeboc, Vraný, Mutějovice, Kounov, Zbrašín, Lišany, Brloh, Hříškov. June was normal as far as temperature is concerned.

Certain problems were caused by heats within the last decade of June, when hops interrupted prolongation growth for certain time – up to the middle of July. Climatic conditions in July were then favourable. As far as the temperatures concerns, July was unusually close to long-term average and precipitations were 30% higher than normally. Strong winds accompanied by rainstorms have caused the destruction of about 15 hectares of hop gardens in Senice na Hané on 12th July 2008. Not even in August the weather veered off the course. It is positive, that total volume of rains has fallen until 17th August 2008, thus before the beginning of the harvest, and therefore the precipitations did not influence adversely the course of hop-picking. Relatively frequent and strong winds then were the only negative phenomenon, which caused the fall of further 5 hectares of hop gardens in Terschitz region.

B. Quality: Alpha contents in original, aroma, the appearance of the cones, the pests

The beginning of spring works on hop gardens related closely to the climatic conditions. Although it could seem that this year it was slightly delayed compared to the previous year, we consider this situation as positive and the progress of spring works was optimal, in spite of certain problems, caused by rainy weather and high number of rainy days in April. The training started between 8th and 10th May, as expected. Beginning of training was characterized by relatively slow growth of hop vines and therefore some hop farms postponed the training. Due to high temperatures and precipitations in the middle of May the hops speeded up the prolongation growth and this fact caused troubles to the farmers in order to manage this important operation within regular term with limited number of workers.

Within May the farmers had to take care of elimination of primary and somewhere also secondary infection of downy mildew of hops (*Pseudoperonospora humuli* Miy et Takah.). The transfer of hop aphid (*Phorodon humuli* Schrank) from the host plants was delayed, but the occurrence of that insect was more intensive. A lot of hop gardens had to be treated against hop aphid by the end of the month. The growth of hops and its development in June was good. The problems started on the beginning of last decade of the month, when the temperatures exceeded 30°C and the hops stopped the prolongation growth. On the other side the creation of lateral shoots was more intensive and in some lower situated locations the hops started to blossom. The migration of hop aphid from stone fruit trees continued on beginning of June. It was recommended to treat affected gardens by preparation Chess 50 WG in dose of 0,8 kg per hectare. By the end of the month the classical preparations Confidor 70 WG, eventually Kohinoor 70 WG or Warrant 700 WG were used. The preparations against red spider mite (*Tetranychus urticae* Koch) were applied as well, especially Nissorun 10 WP or Ortus 5SP.

By the end of the first decade of July the hops started to blossom in full and by the end of the same month there appeared also the second blossoming in part of the gardens. In spite of favourable development of hops, the damages caused in many gardens by windstorms and hailstorms were evident. However, in that period we expected that usual process of production would be restored. In light of the hop protection, the situation in July was normal. The occurrence of red spider mite was focused by the farmers. Furthermore, regular prevention against downy mildew of hops was effected, depending to the monitoring of its possible occurrence. Climatic conditions in August created good ambient for quality maturing of hops.

The harvest started in majority of cases between 18th August and 22nd August 2008. As regards the production, we expect above-average yields in Terschitz and Auscha regions. The harvest in Saaz region will be standard or slightly above-average, as far as the yields is concerned. However, in term of the content of alpha bitter substances we expect aboveaverage results, especially in Saaz region. Even within the final period there were not any serious problems with health state of hop gardens. View to above indicated facts (higher content of alpha bitter substances) we expect more expressive aroma of hops, mainly from the Saaz region. The size of hop cones seems to be adequate, only on irrigated gardens the cones are larger.

Up to today approximately 40% of the contracted hops have been analysed. According to the results we can state, that this year will be at least normal, as far as the content of alpha bitter substances is concerned. We presume that the content of CV will be slightly higher (See Table No. 3).

Following Table shows the results of the alpha bitter substances contents according to particular regions and varieties as per the analyses carried out by the laboratory of Chmelařství, co-operative Žatec.

Table No. 3 – Contents of CV in original material according to varieties and regions (in%)

Region	Saaz	Agnus	Magnum	Sládek	Premiant
Saaz	3,40	12,01	-	6,58	10,10
Auscha	3,23	-	11,54	6,60	10,07
Terschitz	3,03	-	12,20	-	-
Czech Rep.	3,33	12,01	11,94	6,58	10,10

What regards varieties Premiant, Sládek, Agnus and Magnum the results cannot be considered representative, as just a small part of samples have been analysed. The results of analysis of other varieties are still not available.

C. Estimation of acreage and yields according to the regions

The harvested acreage for is shown in following Table. The data indicated were kindly conceded by UKZUZ Žatec.

Table No. 3 – The acreage of Hop Gardens in the Czech Republic (ha)

Region	up to 30.04.2008	up to 20.08.2008	up to 30.04.2007	up to 20.08.2007
Saaz	3 963	3 953	4 008	4 006
of it Saaz var.	3 572	3 562	3 643	3 642
Auscha	663	663	696	681
of it Saaz var.	597	597	632	632
Terschitz	719	719	704	702
of it Saaz var.	579	579	568	566
Czech Rep. total	5 345	5 335	5 408	5 389
of it Saaz var.	4 748	4 738	4 843	4 840

Unfortunately, the decrease of the acreage of hop gardens is continuing. Constantly declining acreage of Saaz semi-early red-bine hops is alarming (decrease by 102 hectares compared to previous year and since 2000 the acreage of Saaz hops decreased by 1175 hectares). The reason of decrease is influenced mainly by bad economical results of hops industry, low price of hops for farmers and increasing costs of production. This problem culminated by strong increase of costs in 2008. The costs of hop wire increased 10%, the price of fuel including light furnace oil recorded the increase of 30%, electricity 10%, similarly increased also the cost of labour and prices of pesticides, apart from the costs of fertilizers, where the increase was 50 to 100%, depending on the type of product. Besides this the whole industry of hop is facing up the increase of the exchange rate of national currency – very strong Czech Crown, what impedes the exporters to offer more attractive prices on the international hop market.

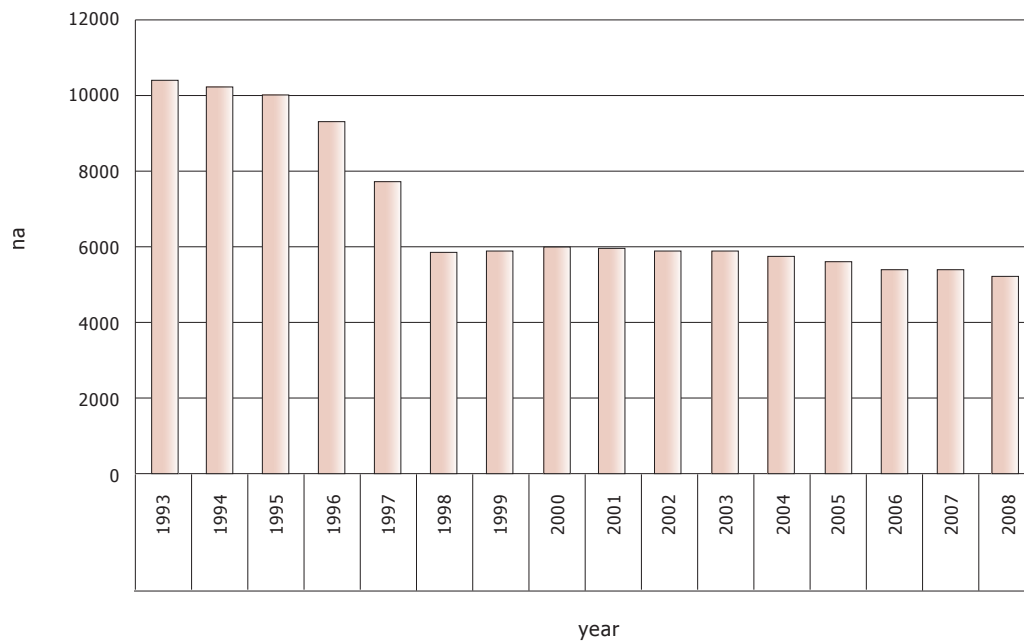
The development of the exchange rate of the Czech Crown is negative for the Czech hop industry, in the long term perspective. View to the fact, that about 80% of the Czech hops are exported, the strengthening of the national currency has fundamental impact to the economical results of the whole industry.

Graph No. 3: Exchange rate of the CZK vs. EUR



In order to illustrate the development of the hop garden acreage within previous ten years in the Czech Republic, we enclose following graph, covering the period of 1998 to 2008.

Graph No. 4: Development of the acreage of hop gardens in the Czech Republic



In our July 2008 Hop Report we estimated the return of hop production in the Czech Republic to the long-term normal. In August we presumed slightly above-average harvest in Auscha and Terschitz regions. According to the first results of the harvest 2008 we can state, that our estimations were correct. The figures indicated in the Table No. 5 should be considered just preliminary, as up to now we have stored only 50% of the contracted hops. A lot of producers did not completed their own harvest and the exact results of the crop will be known only by the end of November 2008, after the summarisation of individual “**Producers declaration about the number and the weight of marked packing with hops according to the cadastral territories and varieties of hops**”, by UKZUZ Žatec.

Table No. 5 – Estimation of the crop according to regions (total)

Region	Harvested area (ha)	Production (t)	Yield in t per ha
Saaz	3 953	4 540	1,15
of it Saaz variety	3 562	3 740	1,05
Auscha	663	930	1,40
of it Saaz variety	597	800	1,34
Terschitz	719	1 130	1,57
of it Saaz variety	579	850	1,47
Czech Republic Total	5 335	6 600	1,24
of it Saaz variety	4 738	5 390	1,14

2. Forecast of the production in the future (2008 – 2010)

A. Expected replacement of the varieties and hypothetic production of individual varieties

Table No. 6 – Comparison as per the Variety Composition in 2006 – 2008

Variety	2008(ha)	2006(ha)	Diff.(ha)		2007(ha)	Diff. (ha)	
			08/06	08/07		08/07	07/06
Saaz	4 738	4 926	- 188		4 840	- 102	- 86
Agnus	52	51	+ 1		51	+ 1	0
Bor	13	17	- 4		10	+ 3	- 7
Fuggle	5	-	+ 5		3	+ 2	+ 3
Premiant	267	181	+ 86		249	+ 18	+ 68
Sládek	239	222	+ 17		215	+ 24	- 7
Others	21	17	+ 4		21	0	+ 4
Czech Rep.	5 335	5 414	- 79		5 389	- 54	- 25

B. Expectation of the planting of new varieties and the yields:

The replacement of Saaz semi-early red-bine hops can be supposed only by virus free forms of that variety. Unfortunately, we expect further decrease of the acreage of hop gardens, especially in case of old growths of Saaz hops, which even after good climatic conditions of this year gave lower yields than the younger ones. The main objective for next years continues the replacement of the plantations, stabilisation of the production and satisfaction of demand on quality Czech hops. We hope that the speeding up of the replacement of the old hop gardens will be supported by a new system of subsidies, approved by the government and carried through in previous year. The producers are learning how to work with it.

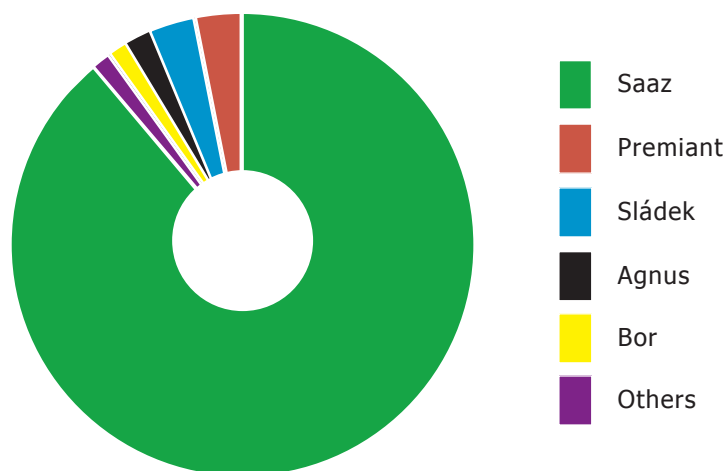
C. Expected production areas and the yield of individual varieties according to the regions

Table No. 7 – Composition of individual varieties on harvested area in 2008

Variety	area 2008	%	area 2007	%
Saaz	4 738	88,83	4 840	89,81
Agnus	52	0,97	51	0,95
Bor	13	0,24	10	0,19
Premiant	267	5,00	249	4,62
Sládek	239	4,48	215	3,99
Others	26	0,48	24	0,44
Czech Republic	5 335	100,00	5 389	100,00

Above Table is supplemented by the Graph No. 5

Graph No. 5: Composition of individual varieties on harvested area in 2008



3. Trends on the hop market

A. The purchase movement from big buying countries

Crop 2007 was second crop consecutive rather low as to quantity and also as to alpha acid content. So once more we had to postpone certain parts of our contracts to future harvests. As crop 2008 seems actually a little bit better than long

year average with reasonable alpha acid content we hope to be able to fulfil all our obligations but practically no free hops for spot market will be available. Due to lack of quantity BHC was not active on the market since 2006 crop.

Japan: smaller contracts compared to previous years, all are to be fulfilled

USA: demand only from craft breweries

Belgium: important contracts concluded in the past continue

China: important contracts concluded in the past continue

Southern Asia: growing demand

Other countries: important number of inquiries from all over the world but BHC is not giving new offers

B. The purchase movement of domestic breweries

New production and export records of czech breweries achieved in 2007. Since January 08 export is rising but domestic consumption is lower compared to previous year due to lower temperatures. Demand for higher quality hops is rising.

C. The estimated forward contract ratio

2009 crop – 100%

2010 crop – 90%

2011 crop – 90%

4. Quality Control

Change of the technology and packing material for Crop 2008

Chmelařství, co-operative Žatec, supported by funds of European Union, has been solving two projects:

- 1) Modification of technology
- 2) Quality improvement of hop cleaning

In the scope of activities, carried on as per point No. 1), Chmelařství, co-operative Žatec, have bought a new machine for imprinting of card-boards. Furthermore the co-operative acquired the generator of pure nitrogen of atmospheric air for the filling of sachets of granules. We assume, that by this way we will replace the liquid nitrogen, whose price is going up constantly. During this season we will test both ways of filling of sachets and evaluate them from economical point of view. By recuperation of warm air coming from hop drying plant to the heating of the space of packing plant we managed to withdraw the electrical direct heating device, used up to now. It should lead to the savings of electrical energy and to improvement of unrolling of foil wrapper in case of lower temperatures. New pipeline for inflow of hops from filling mouth to the homogenizer was bought as well, but it was not still installed due to the quality claim from the side of Chmelařství, co-operative Žatec.

As far as point No. 2 is concerned, Chmelařství, co-operative Žatec, the divisions of packing and mechanization, together with the Czech Agriculture University in Prague, Faculty of mechanization, are solving the possibilities of further cleaning of hops.

5. Pesticide Residua

A. Supplement to the Instruction regarding affusion, in 2008

According to the communication of Mr. Krofta from Chmelařský institut s.r.o. in Žatec, no supplements regarding affusion were issued in 2008.

B. Newly used pesticides

By comparison of Methodology for the Protection of Hops for 2007 and 2008 we recorded the enlistment of new preparations:

	The name of preparation	effective substance
hop aphid:	Chess 50WG	pymetrozine
downy mildew of hops:	Ridomil Gold Combi Pepite	folpet + metalaxylIM

Protected Apellation of origin of Saaz hops

In 2007 the Trade mark of Saaz hops, together with Appellation of origin were officially introduced on Saaz Hops Celebrations, in the presence of minister of agriculture of the Czech Republic, Mr. Petr Gandalovič. Nowadays the commercial companies can mark their hops, delivered to the breweries of the whole world, by this unique label. Saaz hops is the only protected hop product within the European Union.



With compliments

Bohemia Hop Co., LTD.