

# Research subject on hop

Saaz, Semptember 15, 2009

## 1. The situation during the crop year and the quality

### A. Development of the weather and the situation in production 2009

At the enclosure please find the monthly Hop Reports 2009, regularly published on the web sites of Bohemia Hop, a.s. Žatec - [www.bohemiahop.cz](http://www.bohemiahop.cz). Tables No. 1 and No. 2 indicate summarized data concerning the whole vegetation period (April – August) in 2009, compared to the same period of 2008 and to the long-term average covering the period of 1961 to 1990.

**Table No. 1 – Temperature (°C)**

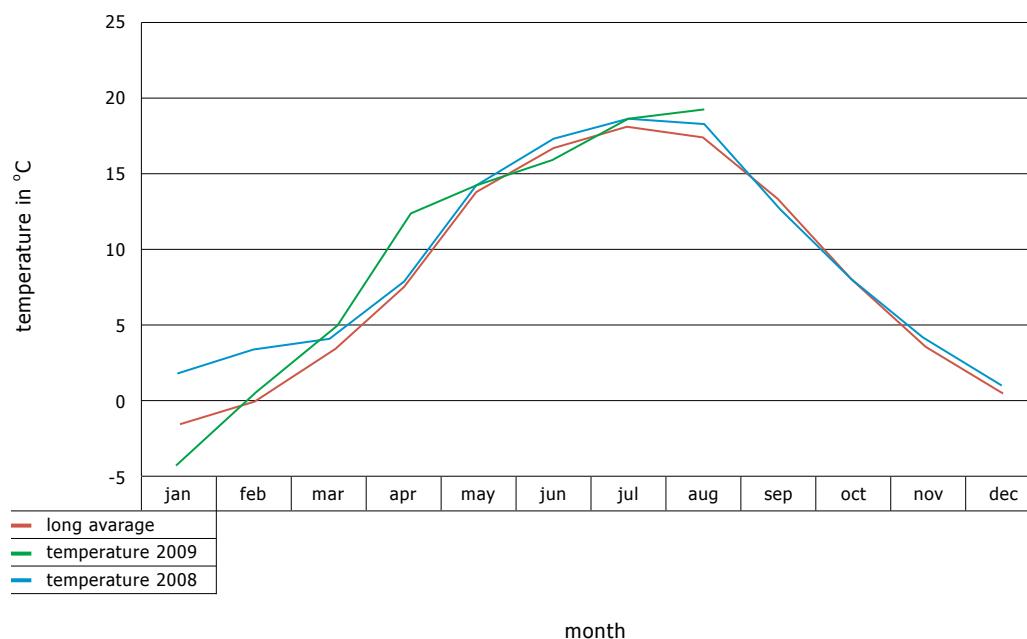
Month	average temperature °C		difference + -	30-years average °C	difference + -
	2009	2008			
April	12,20	8,80	+ 3,40	8,50	+ 3,70
May	14,10	13,90	+ 0,20	13,40	+ 0,70
June	15,70	17,90	- 2,20	16,70	- 1,00
July	18,70	18,20	+ 0,50	18,00	+ 0,70
August	19,30	18,30	+ 1,00	17,40	+ 0,90
<b>Total</b>	<b>80,00</b>	<b>77,10</b>	<b>+ 2,90</b>	<b>74,00</b>	<b>+ 6,00</b>

**Table No. 2 – Precipitations (mm)**

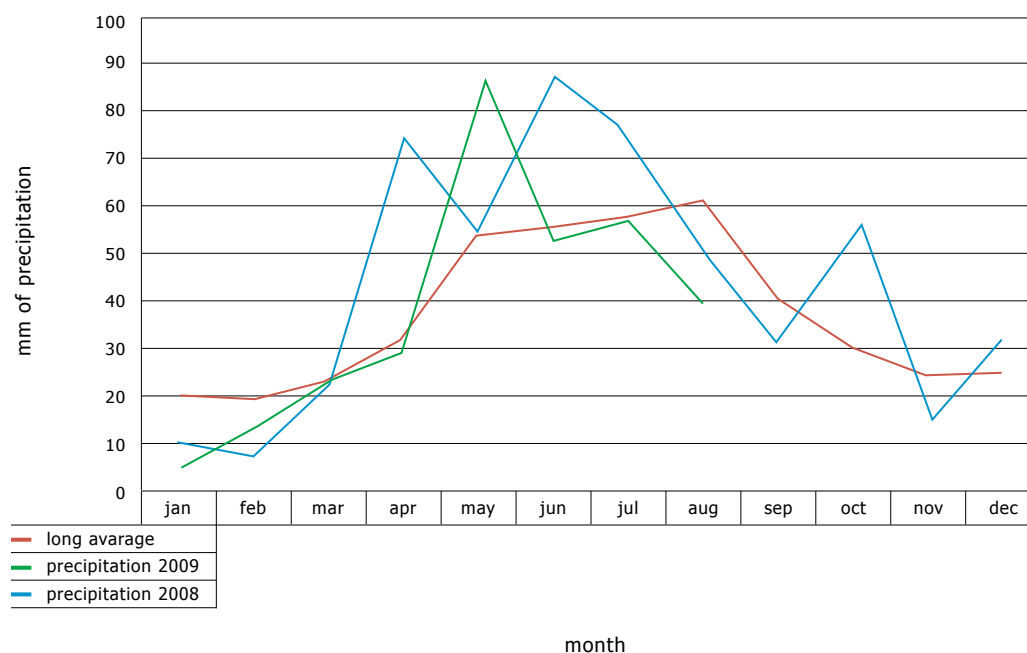
Month	Total precip. per month (mm)		difference + -	30-years average mm	difference + -
	2009	2008			
April	30,00	74,80	- 44,80	32,00	- 2,00
May	85,60	54,40	+ 31,20	54,00	+ 31,60
June	54,40	87,00	- 32,60	56,00	- 1,60
July	58,00	77,20	- 19,20	59,00	- 1,00
August	39,20	48,80	- 9,60	62,00	- 22,80
<b>Total</b>	<b>267,20</b>	<b>342,20</b>	<b>- 75,00</b>	<b>263,00</b>	<b>+ 4,20</b>

The data indicated above are accompanied by Graphs illustrating 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 first quarter of 2009 can be characterized from the point of view of climate conditions as colder, especially the months of January and February. As far as the precipitations are concerned, first two months of the year were below long-term average. The situation improved in March, when the rainfalls exceeded the level of long-term average the temperatures were 1, 6°C higher, in average. Analogously to March, the temperatures in April also exceeded the long-term average and the precipitations reached usual level. Due to high temperatures we considered the weather in April as negative. The temperatures of May corresponded to long-term average; nevertheless the precipitations were rather rich.

Unfortunately, the rainfalls were of stormy nature, accompanied by strong winds and hail squalls. Totally 400 hectares of hop gardens were damaged, out of this number about 100 hectares were damaged seriously, the damnification of them having reached 80 to 100 %.

June of this year was characterized by cold and rainy weather. The temperatures increased only within the third decade of the month. The increase of night temperatures was very important for the growth of hop vines.

Climatic conditions in July were rarely levelled with long-term average, nevertheless also in July the rainstorms occurred, accompanied by strong winds and even hurricanes. 104 hectares of hop gardens have fallen on 23rd of July 2009, from that number 39 hectares in Saaz region, 45 hectares in Auscha region and 20 hectares in Terschitz region. Besides fallen constructions also a lot of individual hop vines were thrown down (2 – 3 % of the total).

August was characterized by high temperatures and low precipitations. The farmers worried about windy weather also in August. Strong winds caused the destruction of further 40 hectares of hop gardens, of it 29, 3 ha in Saaz region and 10, 7 ha in Auscha region.

## **B. Quality: alpha contents in original, aroma, the appearance of the cones, the pests**

The weather conditions on the beginning of this year enabled normal beginning of spring works in the hop gardens. However, we did not consider the beginning of the year, as favourable for hops, from the point of view of climatic conditions. The growing deficit of moisture on one side and high temperatures on the other side have caused the acceleration of the growth by 10 to 14 days. Consequently, the training of hops has been completed with an advance. Due to stature of hop vines, especially those of the early cut, the training had to begin already during the third decade of April, although the optimal period for training is between 8th and 10th May, under normal conditions. Lower temperatures in the first decade caused the deceleration of the growth of hop vines. Consequently, the hops did not overgrow and the training continued properly. Quality training in this year was enabled also by sufficient number of seasonal workers. In majority of cases the training finished around 20th May, 2009. If the advance of growth was estimated on 10 – 14 days in April, in May we spoke just about the advance of 5 – 7 days.

On the beginning of June the growth of hop vines was rather inexpressive, due to low temperatures. The situation improved with coming of higher temperatures by the end of month. The hops started to blossom, nevertheless they did not stop the stretching growth until middle of July, what is considered positive. Good health state of hops was influenced negatively by unfavourable climatic conditions and their consequences. Besides fallen hop gardens the hop cultures were damaged also by breaking of lateral shoots, damaging of leaf area and bruising of hop cones. As hops stopped its stretching growth relatively late, the habitus (the green mass) was richer than usually, especially in case of Saaz semi-early red-bine hops.

The conditions for maturing of hops were not favourable in August. The hops were damaged due to influence of high temperatures and repeating windy weather, the strength of wind reaching the power of hurricane. Hop vines were constantly damaged mechanically. From the point of view of the protection of hops against pests and diseases the first two thirds of vegetation period were practically without problems. Hop aphid (*Phorodon humuli* Schrank) did not almost appear. In case of eventual incidence it was easily eliminated by one spraying by insecticide Confidor 70 WG or by other preparation based on imidaclopride, eventually the treatment by insecticide Chess 50 WG could be used. Downy mildew of hops (*Pseudoperonospora humuli* Myi et Takah.) was monitored; practically until the end of July the farmers managed to maintain the hops free from this disease. Then the contamination of second flowers appeared what influenced the hop picking on certain gardens. The end of vegetation period, the development of weather conditions in August, especially very high temperatures, created favourable ambience for fast proliferation of various generations of red spider mite (*Tetranychus urticae* Koch). The hop garden, which were not treated by quality and fast spraying by the preparation Omite 30 W in a proper time, were showing marks of damage by this pest.

The harvest started in majority of cases between 17th August and 21st August 2008. Due to strong habitus of vines the harvest took more time – in average by 2 days, as it was necessary to slow down the operational speed of hop-picking machines view to quality of hop picking. In light of quantity we expect an average harvest in all regions. As per the first laboratory analysis we can state that the content of alpha bitter substances in all varieties will be very good.

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-ST	Saaz virus free	Saaz	Sládek	Premiant
Saaz	3,54	4,18	3,89	7,48	10,30
Auscha	3,47	4,63*	3,52	6,40	10,53
Trschitz	2,98	3,70	3,68	-	9,80
<b>Czech Rep.</b>	<b>3,52</b>	<b>4,04</b>	<b>3,81</b>	<b>7,44</b>	<b>10,28</b>

\*this data concerns small number of batches of Saaz semi-early red-bine hops planted in autumn of 2008

The results cannot be considered representative in case of Premiant and Sládek varieties, 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

**Table No. 4 – The acreage of hop gardens in the Czech Republic (ha)**

Region	up to 30.04.2009	up to 20.08.2009	up to 30.04.2008	up to 20.08.2008
Saaz	3 899	3 899	3 963	3 953
of it Saaz var.	3 456	3 456	3 572	3 562
Auscha	669	671	663	663
of it Saaz var.	596	596	597	597
Trschitz	737	737	719	719
of it Saaz var.	575	575	579	579
<b>Czech Rep. total</b>	<b>5 305</b>	<b>5 307</b>	<b>5 345</b>	<b>5 335</b>
<b>of it Saaz var.</b>	<b>4 627</b>	<b>4 627</b>	<b>4 748</b>	<b>4 738</b>

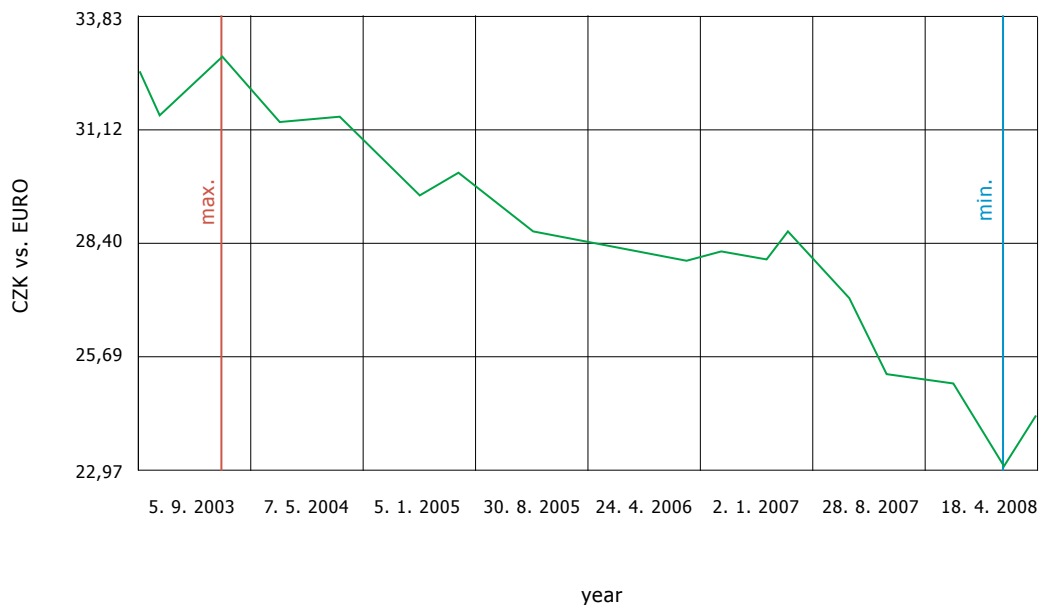
The harvested acreage in 2009 is shown in following Table. The data indicated were kindly conceded by UKZUZ Žatec.

Unfortunately, the decrease of the acreage of hop gardens is continuing. The decline of the acreage of Saaz semi-early red-bine hops nevertheless slowed down. The improvements of the economical results of growing and easier sale of this variety in 2008 were very helpful in order to make the situation better. However, all the errors resulting from the economy of hop production of the middle of the nineties of twentieth century influenced negatively by low price of hops and by increasing costs of production were not fully retrieved up to now. Besides this the whole industry of hop is facing up strong national currency (CZK – Czech Crown), what forbids to the exporters to offer more interesting prices on the hop world market.

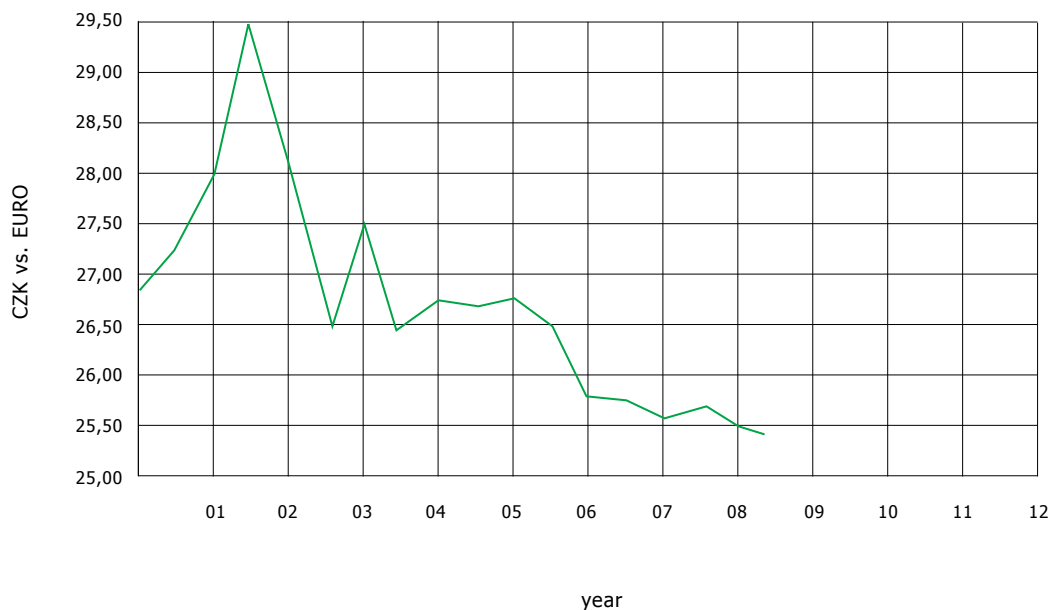
### The exchange rate of the czech crown is still negative for the czech hop industry

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**

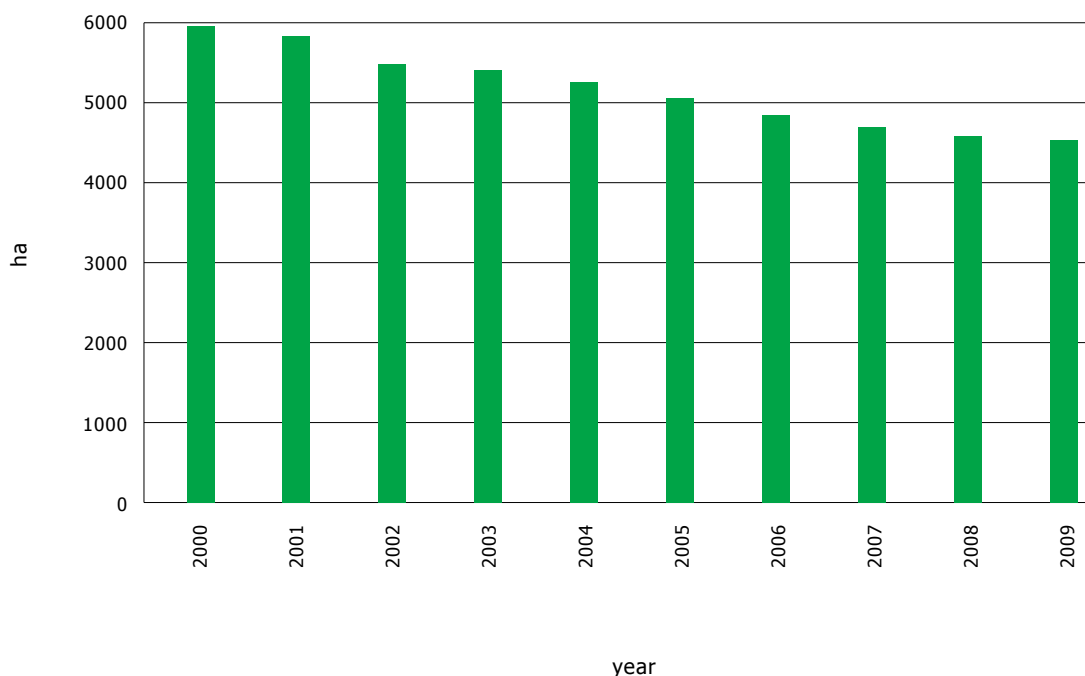


**Graph No. 4: Exchange rate of the CZK vs. EUR in 2009**



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 2000 to 2009.

**Graph No. 5: Development of the acreage of hop gardens in the Czech Republic (Saaz semi-early red-bine)**



The estimations of hop production in the Czech Republic in this year vary on the level of long-term average, in all production regions of the country. However, previous forecasts from the beginning of July were higher, as the state of hop gardens in that period was more promising. The figures indicated in the Table No. 5 should be therefore considered just preliminary estimation, owing to the fact, that up to now approximately 40% of the contracted quantity has been delivered to the warehouses. A lot of producers did not complete their own harvest and the exact results of the crop will be known only in November 2009, 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	3 899	4 490	1,15
of it Saaz variety	3 456	3 650	1,05
Auscha	671	820	1,22
of it Saaz variety	596	700	1,17
Trschitz	737	1 120	1,52
of it Saaz variety	575	780	1,35
<b>Czech Republic Total</b>	<b>5 307</b>	<b>6 430</b>	<b>1,21</b>
<b>of it Saaz variety</b>	<b>4 627</b>	<b>5 130</b>	<b>1,11</b>

## 2. Forecast of the production in the future

### A. Expected replacement of the varieties and hypothetical production of individual varieties

**Table No. 6 – Comparison as per the variety composition in 2007 – 2009**

Variety	2009(ha)	2008(ha)	Diff.(ha) 09/08	2007(ha)	Diff. (ha) 08/07	09/07
Saaz	4 627	4 738	- 111	4 840	- 102	- 213
Agnus	58	52	+ 6	51	+ 1	+ 7
Bor	13	13	0	10	+ 3	+ 3
Fuggle	5	5	0	3	+ 2	+ 3
Premiant	293	267	+ 26	249	+ 18	+ 44
Sládek	277	239	+ 38	215	+ 24	+ 62
Others	34	21	+ 13	21	0	+ 13
<b>Czech Rep.</b>	<b>5 307</b>	<b>5 335</b>	<b>- 28</b>	<b>5 389</b>	<b>- 54</b>	<b>- 82</b>

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

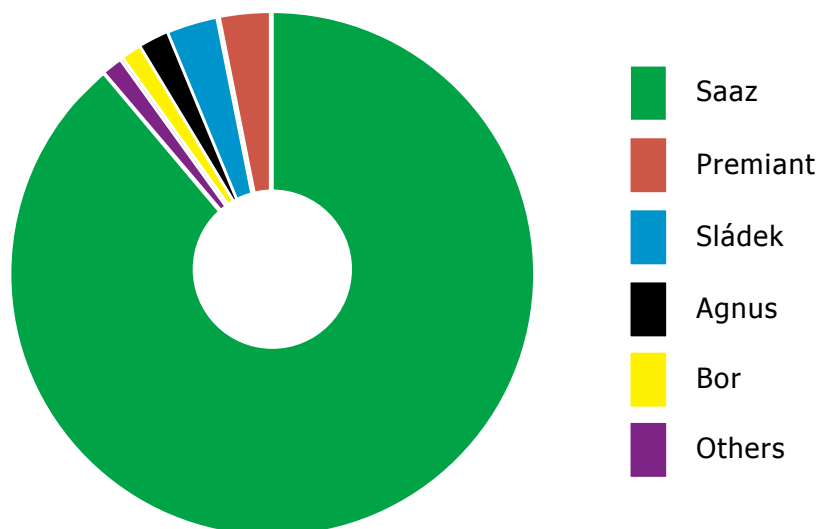
The replacement of Saaz semi-early red-bine hops will be done by virus free forms of that variety only. The most important target is still the renewal of the cultures of Saaz hops, especially in Saaz region, the stabilization of its production and by this way the covering of the demand after quality Czech hops. Besides the subsidy system, which supports the renovation of hop gardens from the European as well as national sources, Chmelařství, cooperative Žatec implemented its own subsidiary system, which will prefer the growers engaged actively in renewal of hop gardens. The impact will be given to the renovation of areas, used for plantation of the Saaz semi-early red-bine hops variety.

**Table No. 7 – Composition of individual varieties on harvested area in 2009**

Variety	area 2009	%	area 2008	%
Saaz	4 627	87,19	4 738	88,83
Agnus	58	1,09	52	0,97
Bor	13	0,24	13	0,24
Premiant	293	5,52	267	5,00
Sládek	277	5,22	239	4,48
Others	39	0,74	26	0,48
<b>Czech Republic</b>	<b>5 307</b>	<b>100,00</b>	<b>5 335</b>	<b>100,00</b>

Above Table is supplemented by the Graph No. 6

**Graph No. 6: Composition of individual varieties on harvested area in 2009**



### 3. Trends on the hop market

#### A. The purchase movement from big buying countries

Crop 2008 was second biggest in this century and also alpha acid content was slightly over average. BHC was able to deliver big part of postponed quantities from previous crops. Also crop 2009 seems to be over average as to quantity and also as to alpha. Due to this fact some quantity will remain for spot market. Due to economic crisis most of breweries worldwide sell less beer and we were asked to postpone deliveries from 08 and also from 09 harvests.

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

USA: demand only from craft breweries

Belgium: difficult situation, we are not sure if all contracted quantities are to be delivered

China: considerably bigger quantities of all czech varieties are required

Southern Asia: slightly growing demand

Other countries: demand is slightly decreasing due to economic crisis

#### B. The purchase movement of domestic breweries

Smaller traditional breweries are running well, bigger not so well – decreasing sales and exports. Less foreign tourists, after many years domestic production and consumption are going down with all consequences for suppliers of raw materials.

#### C. The estimated forward contract ratio

2010 crop – 90%

2011 crop – 80%

2012 crop – 50%



## 4. Quality Control

### Change of the technology and packing material for crop 2009

According to the information from Mr. Urban, Chmelařství, co-operative Žatec has effected following changes and improvements:

1) Plant SNB, Mostecká street, Žatec:

New floor in SNB plant, which enables better sanitation  
Improvement of the manipulation with biological waste  
New manipulator of heavy packing

2) Plant Mletý chmel, Chmelařské square, Žatec

New printing technology of sachets and cardboards

## 5. Pesticide residua

### A. Supplement to the instruction regarding affusion, in 2009

According to the communication of Mr. Krofta from Chmelařský institut s.r.o. in Žatec, no supplements regarding affusion were issued in 2009. All the changes scheduled will be effected in co-ordination with the Regulation of EU Commission.

### B. Newly used pesticides

By comparison of Methodology for the Protection of Hops for 2009 and 2008 we recorded the enlistment of new preparations:

The name of preparation	effective substance	Use
Marshal 25 EC	carbosulfan	hop aphid, alfalfa snout weevil, flea beetle, jumping tree bug, rosy, rustic moth
Karate 2,5 WG	lambda-cyhalothrin	hop aphid, flea beetle, jumping tree bug
Furadan 350F, 5G, 10	carbofuran	alfalfa snout weevil, rosy rustic moth

### C. System of control of pesticide residuas

Chmelařský institut, s.r.o. Žatec (Hop Research Institute, s.r.o. Žatec) did not receive any instructions in order to change the control system of pesticide residua, so that it goes on in compliance with the present trends.

With compliments

Bohemia Hop Co., Ltd.