Research subject on hop 2010

Saaz, Semptember 15, 2010

1. The situation during the crop year and the quality

A. Development of the weather and the situation in production 2010

At the enclosure please find the monthly Hop Reports 2010, 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 2010, compared to the same period of 2009 and to the long-term average covering the period of 1961 to 1990.

Table No. 1 – Temperature (°C)

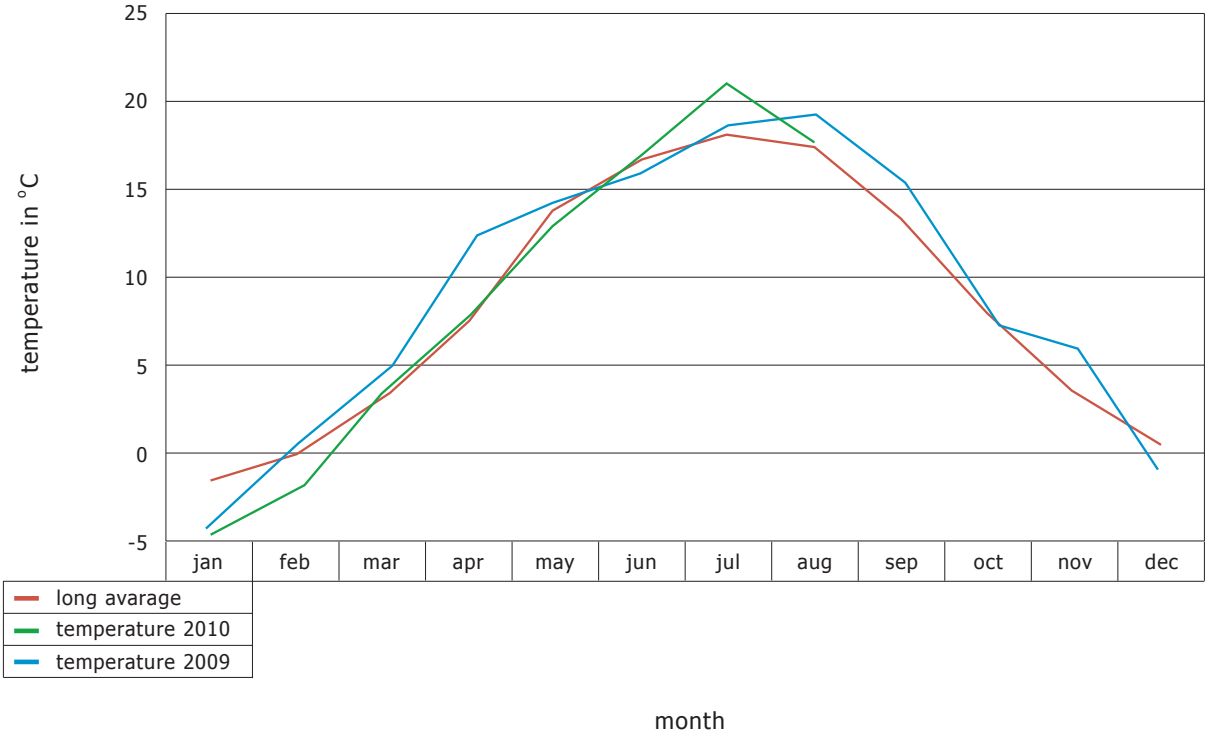
Month	average temperature °C 2010	2009	difference + -	30-years average °C	difference + -
April	8,50	12,20	- 3,70	8,50	0,00
May	12,00	14,10	- 2,10	13,40	- 1,40
June	17,00	15,70	+ 1,30	16,70	+ 0,30
July	20,70	18,70	+ 2,00	18,00	+ 2,70
August	17,70	19,30	- 1,60	17,40	+ 0,30
Total	**75,90**	**80,00**	**- 4,10**	**74,00**	**+ 1,90**

Table No. 2 – Precipitations (mm)

Month	Total precip. per month (mm) 2010	2009	difference + -	30-years average mm	difference + -
April	24,60	30,00	- 5,40	32,00	- 7,40
May	102,00	85,60	+ 16,40	54,00	+ 48,00
June	109,00	54,40	+ 54,60	56,00	+ 53,00
July	122,40	58,00	+ 64,40	59,00	+ 63,40
August	103,40	39,20	+ 64,20	62,00	+ 41,40
Total	**461,40**	**267,20**	**+ 194,20**	**263,00**	**+ 198,40**

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 2010.

Graph No. 1 – Average temperatures



Graph No. 2 – Precipitations per month

From the point of view of temperature development the first quarter of 2010 was below long term average. It was influenced mainly by low temperatures in January and February. The average temperature in January decreased to -4,2°C, i.e. two degrees below long term average. The average temperature in February was then recorded on –2,3°C, while long term average in this month is just -0,2°C. The first quarter precipitations varied a lot. January records have shown out 22,6 mm of precipitations, i.e. 113% of long-term average, and the ratio towards rainfalls of January 2009, recorded on 6,6 mm, amounts 342,4%. On the other side, February and March were very dry and the precipitations within these two months reached only 40% of long-term average. Thawing snow thanks to deeply frozen soil did not drain away and more to the contrary all the moisture soaked into the earth. The level of subsoil water increased expressively and by this way the soil water conditions substantially improved. The disadvantage of this phenomenon nevertheless lie in the fact, that the compacted soil was not mellow sufficiently and therefore it was churlish.

April took up to the temperature character of long-term average. The precipitations decreased below the normal level and they were also lower than in 2009. From the point of view of climatic conditions April was not favourable for timely beginning of field works.

May was different not only from the character of weather recorded in previous years, but also from long-standing normal. The precipitations reached 200% of long-term average and medium monthly temperature was then lower than long-term average by 1,4 °C. On 24th of May, 2010, part of the hop gardens in Saaz region was damaged by hail-storm. Altogether 204 ha of hops were harmed, from that 148 ha were endamaged by less than 30%, 20 ha between 30% and 60% and 36 ha more than 80%. In term of the varieties´ composition, 181 ha of damaged hop gardens were of Saaz semi-early red-bine hops, 17 ha of hop gardens of Sládek variety and 6 ha of Premiant variety.

The level of long-term normal of precipitations was exceeded again in June, that time it reached 194,6% of the average. The rainfalls of squally character accompanied by hail-storms damaged further 12 ha of hop gardens of Sládek and Premiant varieties. An expressive increase of temperatures by the end of the first and third decades helped to align the average monthly temperature to the long-term average.

Climatic conditions in July were characterised again by high rainfall totals, reaching 207,5% of long-term average. The development of hops was then adversely influenced by high temperatures within the second decade, when the elongating growth of hop vines was stopped.

Rainfalls in August, as well as during the whole vegetation period of 2010, were relatively high (166,8% of long-term average). Owing to those rains and owing to soaked soil 19,3 ha of hop gardens have fallen, from that 15,3 ha of Saaz semi-early red-bine hops and 4,0 ha of Sládek variety. 7,5 ha of hop gardens of Saaz variety have fallen also in Auscha region. Abundant rains and underflooded soil in hop gardens then caused big problems with the protection of hops in that period and especially during the harvest.

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

Climatic conditions on the beginning of the calendar year delayed the start of spring works in hop gardens. Despite of it the hop growers managed an important operation – the cut of the hops in a proper time. Also stringing up and recessing of hop wires were finished until the end of April.

Adverse climatic conditions in May caused problems in setting-up the optimal time of training of hops due to its slow growth. It was connected to the difficulties in hop vine protection. The vines continued to get behind and by the end of the month the delay in development made approximately 10 days. In spite of this the hop training was finished until the end of May. In comparison of above mentioned evolvement to the situation of 2009, when we stated, on the contrary, that the development of the vegetation was advanced by 10 to 14 days, we considered the whole situation as very serious for further progress of hops. The hop vines did not reach the usual medial height and they were seriously endangered by dispersion of fungal diseases. In that period it was recommended to carry out the first treatment against the secondary infection of downy mildew of hops (Pseudoperonospora humuli Myi et Takah.). No occurrence of aphides (Phorodon humuli Schrank) nor red spider mite (Tetranychus urticae Koch.) has been ascertained within that period.

At the beginning of June the growth of hops was still inexpressive due to low temperatures. By the end of the month approximately 35% of vegetation reached the top of garden constructions. Other hop vines were 1,0 m to 1,5 m below the level of the construction. Hops nevertheless continued to show all the symptoms of stretching growth (it did not curtail the length of internodium in upper floors of the plant). Although the habitus of hop vines was weaker, we assessed the setting of lateral shoots as very good. Favourable conditions for propagation of downy mildew of hops continued. The recommendation was to carry out the treatment against the secondary infection. On the areas with increased occurrence of spicated shoots it was necessary to proceed to their physical liquidation. In some areas the farmers had to accomplish also the treatment against hop aphid in the period around 10th June. Between 25th June and 30th June, 2010, there was then applied basic affussion against this pest, mostly based on imidacloprid, flonicamid and pymetrozine. Before the end of the month the growers effected also the spraying against red spider mite by the preparation Nissorun 10 WP.

Favourable conditions for stretching growth of hops were interrupted by tropical temperatures within the second decade of July. During that period the hops also started to blossom. The set of flowers was unusually rich also thanks to well developed lateral shoots. Due to high temperatures the hops flourished relatively long time. It started to create the cones only at the beginning of July. Thanks to care from the side of the growers the health state of hops remains on good level. In spite of increased number of chemical interventions against downy mildew of hops by one to two spraying more it was necessary to pay always attention to occurrence of this disease.

The cone formation of hops went ahead in August. Although the habitus of hops was not expressive, the share of cones on individual vines compared to other material was very good. The climatic conditions themselves nevertheless were not optimal for ripening of hops, especially for creation of alpha-bitter substances. This year we expect lower content of alpha-bitter substances in comparison with previous year as well as in comparison to long-term normal, which represents 3,3% in case of Saaz semi-early red-bine hops. The occurrence of downy mildew of hops threatened all the time. The treatment in this period was very complicated and exigent. A lot of hop gardens were waterlogged for a long time and therefore the protection of hops in some areas was for a certain period even impossible. That is why some hops will be partially damaged by downy mildew of hops.

Irregular ripening of hops caused also a wide dispersal in beginning of the harvest by individual growers. The first ones started to harvest already on 16th of August, 2010 and the last ones only on 30th of August 2010. However, it is necessary to mention that majority of growers started the harvest within the period between 21st August and 25th August 2010. The hop-picking took more time in this year in majority of cases due to higher production of hops than we expected. Certain abnormality of this year was the discordance between the harvesting and drying capacities. It was rather frequent, that the harvesting machines had to be stopped during the hop-picking due to overcharging of drying houses. In spite of all the problems as described above, majority of hops is in good health condition. The colour is not accompanied by polish, indeed, but it was caused by rainy weather even within the harvest. The cone formation we assess as medial. As far as the aroma is concerned, the first lots are slightly weaker, probably due to lower content of alpha-bitter substances.

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 alpha acids (CV) in original material according to varieties and regions (in%)

Region	Saaz-ST	Saaz virus free	Saaz	Sládek	Premiant
Saaz	2,87	3,20	3,10	-	10,80*
Auscha	2,90	3,33*	3,20	-	9,10*
Trschitz	2,60*	2,16	2,33*	-	8,60*
Czech Rep.	**2,89**	**3,20**	**3,08**	**-**	**9,70***

*this data concern small number of batches

The results cannot be considered representative in case of Saaz semi-early red-bine hops from the regions of Auscha and Terschitz, and in case of Premiant variety, as just a small part of samples have been analysed. The results of analysis of Sládek variety and other varieties are still not available due to delayed harvest.

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 30.04.2010	up to 20.08.2010	up to 30.04.2009	up to 20.08.2009
Saaz	3 839	3 831	3 899	3 899
of it Saaz var.	3 405	3 410	3 456	3 456
Auscha	655	637	669	671
of it Saaz var.	572	565	596	596
Trschitz	744	742	737	737
of it Saaz var.	582	582	575	575
Czech Rep. total	**5 238**	**5 210**	**5 305**	**5 307**
of it Saaz var.	**4 559**	**4 557**	**4 627**	**4 627**

The harvested acreage in 2010 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, even in case of the Saaz semi-early red-bine hops, in spite of the fact, that Chmelařství, co-operative Žatec, offered number of bonuses in order to intensify the restoration of this variety. Though, we can state on the basis of the estimations of this year crop that the condition of hop gardens improved a little bit.

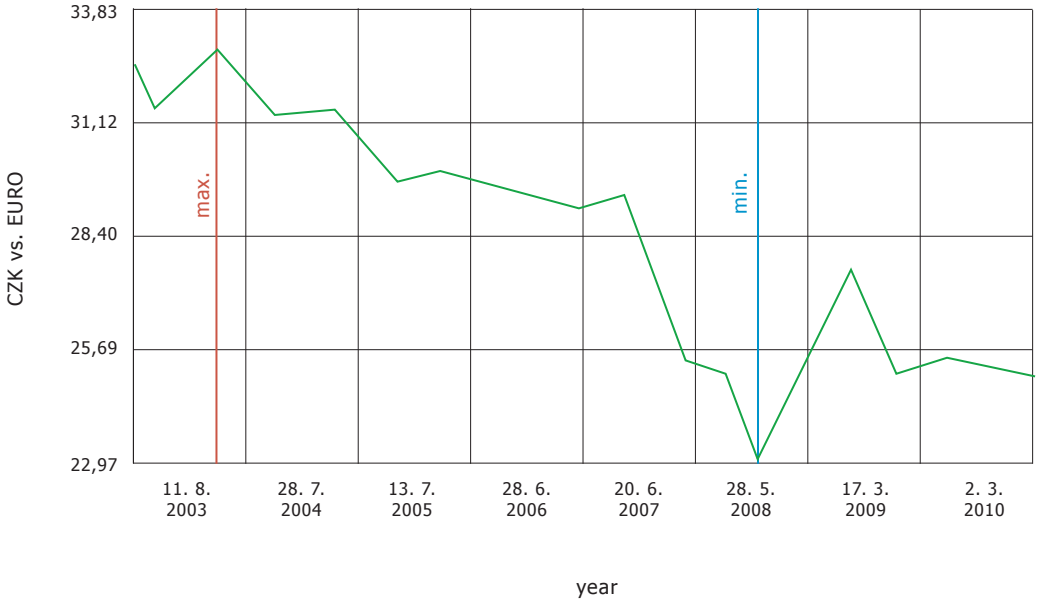
The improvements can be demonstrated mainly by decrease of interspace in vegetation and partially also by improvement of the age structure of the hop gardens. It was enabled also by the support from the side of the Czech and world breweries, in order to create favourable conditions for production as well as for sale of hops.

Unfortunately we also see a decreasing interest in purchasing Saaz semi-early red-bine hops Crop 2010 from the side of some of the important and traditional clients. 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.

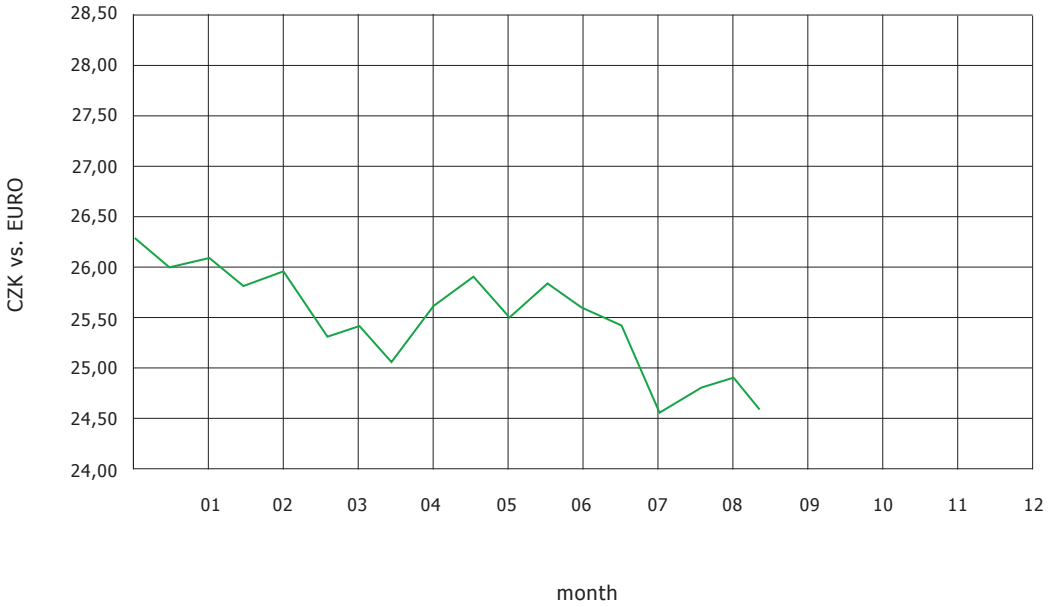
The exchange rate of the czech crown is still negative for the czech hop industry

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



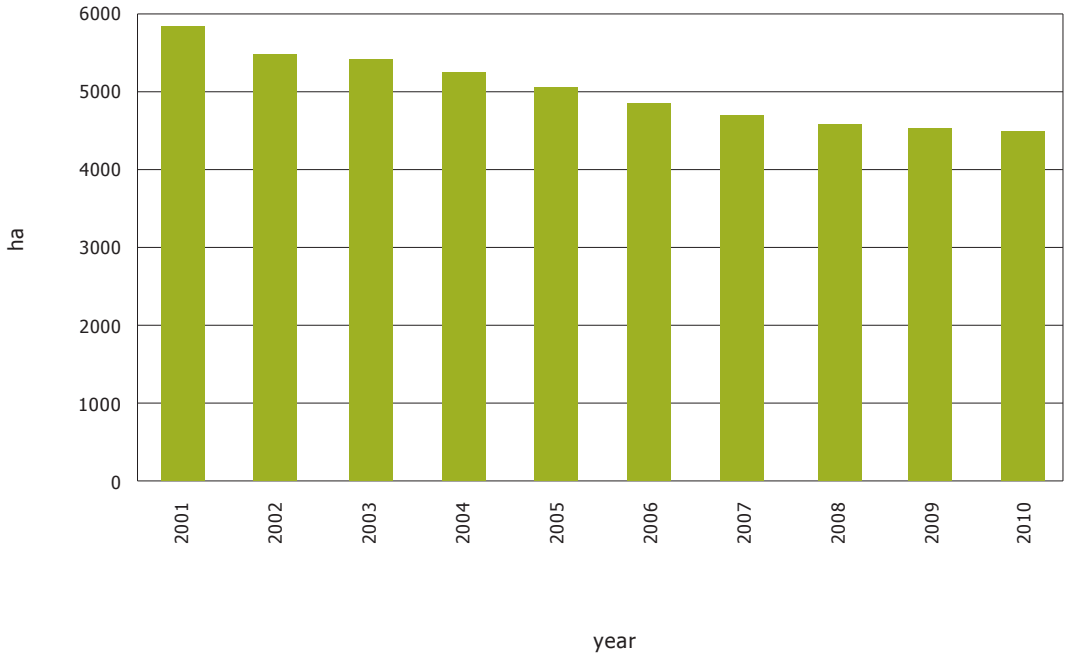
Graph No. 4: Exchange rate of the CZK vs. EUR in 2010



Currrent rate (08.09.2010): 1 EUR = 24,710 CZK

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 2010.

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 constantly varied in time alongside with the ripening of hops. Now it is already evident, that the total production of hops in 2010 will be above the level of long-term normal, especially in the Saaz region. If we were afraid in July, that the long-term average would not be achieved, then the start of the harvest exceeded our expectations. The figures indicated in the Table No. 5 should be considered just an estimation, view to the fact, that up to now only approx. 40% of the contracted quantity has been delivered to the warehouses. Many growers did not still finished their harvest and the exact results of the crop will be known only by the end of the month of November, after the summarization 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.

It is fundamental, that we will be able to fulfil long-term contracts concluded with our customers and by this way to assure them of our responsibility as a business partner for the future.

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

Region	Harvested area (ha)	Production (t)	Yield in t per ha
Saaz	3 831	5 240	1,37
of it Saaz variety	3 410	4 440	1,30
Auscha	637	990	1,55
of it Saaz variety	565	850	1,50
Trschitz	742	1 190	1,60
of it Saaz variety	582	870	1,50
Czech Republic Total	**5 210**	**7 420**	**1,42**
of it Saaz variety	**4 557**	**6 160**	**1,35**

2. Forecast of the production in the future (2010 - 2012)

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

Table No. 6 – Comparison as per the variety composition in 2008 – 2010

Variety	2008(ha)	2009(ha)	Diff.(ha) 09/08	2010(ha)	Diff. (ha) 10/08	10/09
Saaz	4 738	4 627	- 111	4 557	- 181	- 70
Agnus	52	58	+ 6	61	+ 9	+ 3
Bor	13	13	0	4	- 9	- 9
Fuggle	5	5	0	5	0	0
Premiant	267	293	+ 26	277	+ 10	- 16
Sládek	239	277	+ 38	277	+ 38	0
Others	21	34	+ 13	29	+ 8	- 5
Czech Rep.	**5 335**	**5 307**	**- 28**	**5 210**	**- 125**	**- 97**

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

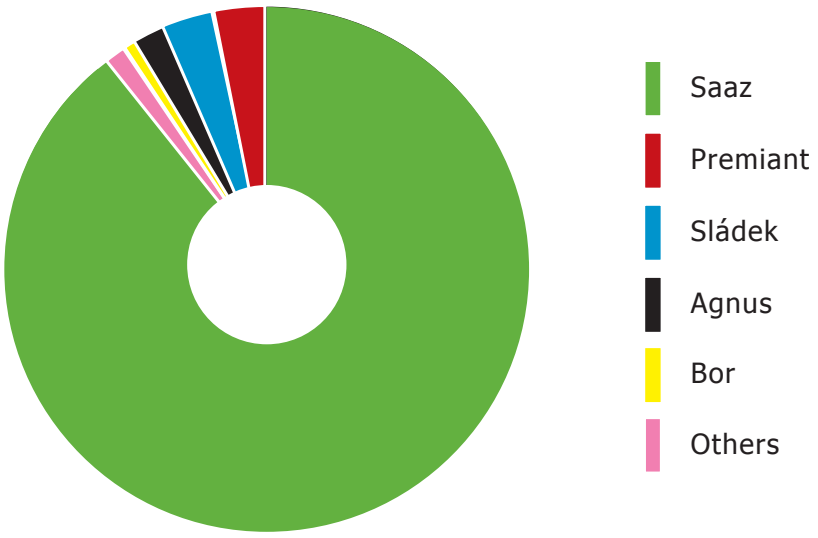
The replacement of Saaz semi-early red-bine hops will be done only by virus free forms of this variety, which show out better results in terms of productivity as well as in terms of content of alpha-bitter substances. Renewal of the gardens of Saaz semi-early red-bine hops remains the main objective in spite of unfavourable sales conditions, together with the decrease of the age grade of individual hop gardens, especially in the Saaz region. It will be necessary to stabilize its production in order to fill a demand after quality Czech hops in the future. A significant decrease of acreage of hop gardens can be expected view to current state of the contracting (e.g. in Japan) for the years 2011 to 2015. Subsidiary system, supporting the renewal of hop gardens by using national as well as European resources, will be applied also in the next year. The most probably, the country administration will nevertheless decrease the amount of financial funds in these programs. Also Chmelařství, co-operative Žatec, will have to reassess its own subsidiary system, which preferred the growers that were intensively concerned in renewal and extension of the share of Saaz semi-early red-bine hops. Thus arise the question: “Were our common efforts in favour of renascence and strengthening of the share of Saaz semi-early red-bine hops really useless? Did not the expended resources miss their purpose when the total demand from some traditional customer is currently and for the next several years much lower?”

Table No. 7 – Composition of individual varieties on harvested area in 2009 and 2010

Variety	area 2010	%	area 2009	%
Saaz	4 557	87,50	4 627	87,19
Agnus	61	1,18	58	1,09
Bor	4	0,08	13	0,24
Premiant	277	5,33	293	5,52
Sládek	277	5,33	277	5,22
Others	29	0,58	39	0,74
Czech Republic	**5 210**	**100,00**	**5 307**	**100,00**

Above Table is supplemented by the Graph No. 6

Graph No. 6: Composition of individual varieties on harvested area in 2010



3. Trends on the hop market

A. The purchase movement from big buying countries

Crop 2009 was over average as to harvested quantity and very rich as to alpha acid content. Despite these facts Czech Republic is one of very rare hop growing countries where practically no inventories remained unsold from old crops as everything was sold out. Crop 2010 seems to be very high with slightly under average alpha acid content. Quite large volumes are to be offered on spot market. Sales of whole harvested volume will be difficult. With the exception of a few countries beer industry worldwide is not running well as to sold volumes of beer, especially in developped countries where breweries adopted cheaper brewing methods and raw materials but beer lost drinkability.

Japan: dramatical decrease of contracted volumes with possible negative impacts
on the czech hop industry in the future
USA: craft breweries continue to use czech hops
Belgium: big brewers in difficulties with sales, smaller traditional brewers are running very well
so standard volumes of sold hops
China: chinese brewers very successful with improved higher quality lager and premium brands,
volumes of sold czech hops are in progress
Southern Asia: slightly growing demand
Other countries: standard demand

B. The purchase movement of domestic breweries

Sales of mainstream and lower quality brands in decrease, sales of lager and premium brands mainly brewed by smaller breweries using traditional brewing methods and raw matierials successful on the market. Less turists and lower export due to impacts of economic crisis.

C. The estimated forward contract ratio

2011 crop – 60%
2012 crop – 50%
2013 crop – 40%

4. Quality Control

Change of the technology and packing material for crop 2010

The most exigent process (both financially and time-consuming) was the increase of the capacity of the warehouse for granulated hops in the plant Mletý chmel. The warehouse capacity will double and primarily a new system of lodgement of growers´ rectangular bales.

The surface conditioning of floors in SNB plant has been finished.
The marking machine was improved in order to enable its use also for big types of packing (cartons of 90kg).
Drying furnace has been replaced and new burner installed.

5. Pesticide residua

A. Supplement to the instruction regarding affusion within previous year

According to the communication of Mr. Krofta from Chmelařský institut s.r.o. in Žatec, no supplements regarding affusion were issued in 2010. All the changes scheduled will be effected in co-ordination with the Regulation of EU Commission.

B. Newly used pesticides

By comparison of Methodology of the Protection of Hops for 2009 and 2010 we recorded the enlistment of new preparations:

Use	The name of preparation	effective substance
Downy mildew of hops	Aliette 80 WG (other form of emulsion than up to now used Aliette 80 WP)	fosetyl Al
	Cuprocafaro micro	oxychlorid Cu
	Flowbrix	oxychlorid Cu
	Polyversum	oosporas
Powdery mildew	Lynx	tebuconazole

Following preparations have been excluded from the list:

Use	The name of preparation	effective substance
Alfalfa snout beetle *(Otiorhynchus ligustici L.)* Smoky wainscot *(Hydraecia micacea Esper.)*	Regent 800 WG	fipronil

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.

Prepared by the procurement department
Žatec, 15th September 2010

With copliments

Bohemia Hop Co., Ltd.