

FINAL HOP REPORT - CROP 2014

Saaz, September 22, 2014



THE SITUATION DURING THE CROP YEAR AND THE QUALITY

A/ Development of the Weather and the Situation in Production 2014

Enclosed please find the monthly Hop Reports 2014, 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 2014, compared to the same period of 2013 and to the long-term average covering the period of 1961 to 1990.

Table No. 1 – Temperature (°C):

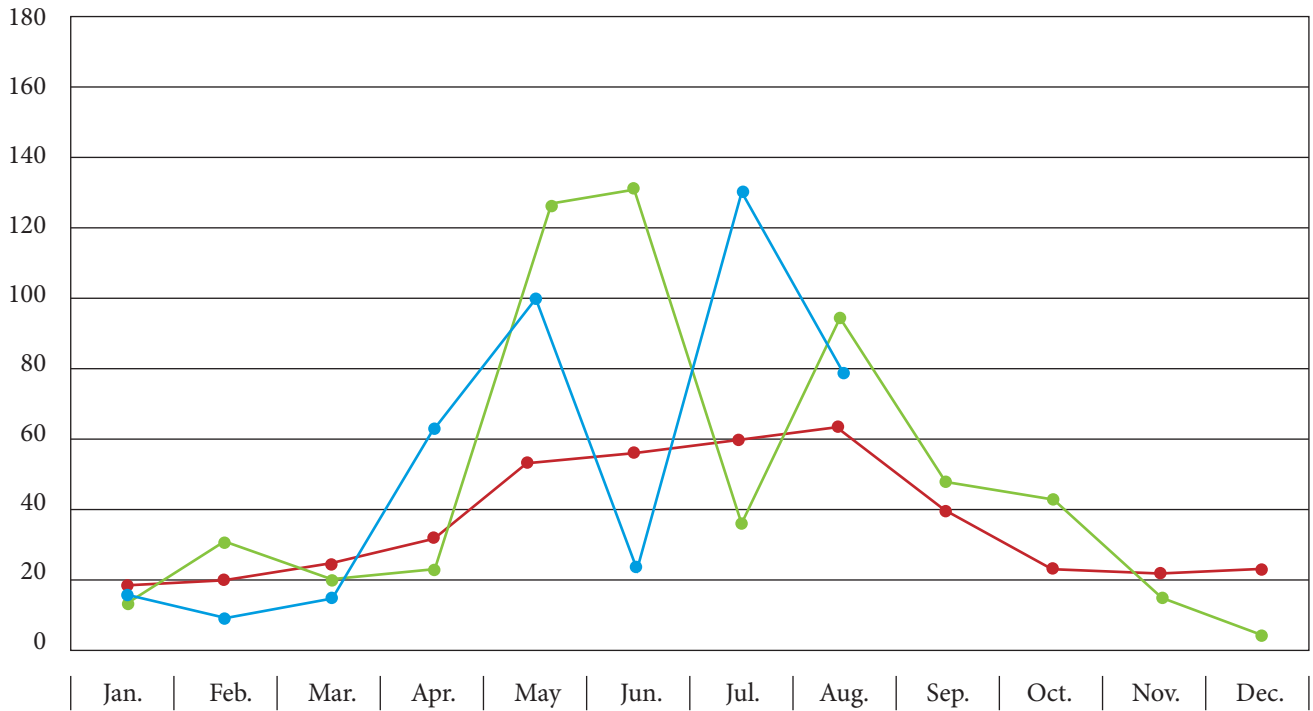
Month	average temperature		difference + -	30-years average	difference + -
	2014	2013			
April	10,90	8,90	+ 2,00	8,50	+ 2,40
May	13,00	12,60	+ 0,40	13,40	- 0,40
June	16,60	16,50	+ 0,10	16,70	- 0,10
July	20,00	20,30	- 0,30	18,00	+ 2,00
August	16,70	17,90	- 1,20	17,40	- 0,70
Total	77,20	76,20	+ 1,00	74,00	+ 3,20

Table No. 2 – Precipitations (mm):

Month	Total precip. per month		difference + -	30-years average	difference + -
	2014	2013			
April	61,60	21,60	+ 40,00	32,00	+ 29,60
May	101,00	124,80	- 23,80	54,00	+ 47,00
June	26,30	128,60	- 102,30	56,00	- 29,70
July	127,60	37,60	+ 90,00	59,00	+ 68,60
August	78,80	94,80	- 16,00	62,00	+ 16,80
Total	395,30	407,40	- 12,10	263,00	+ 132,30

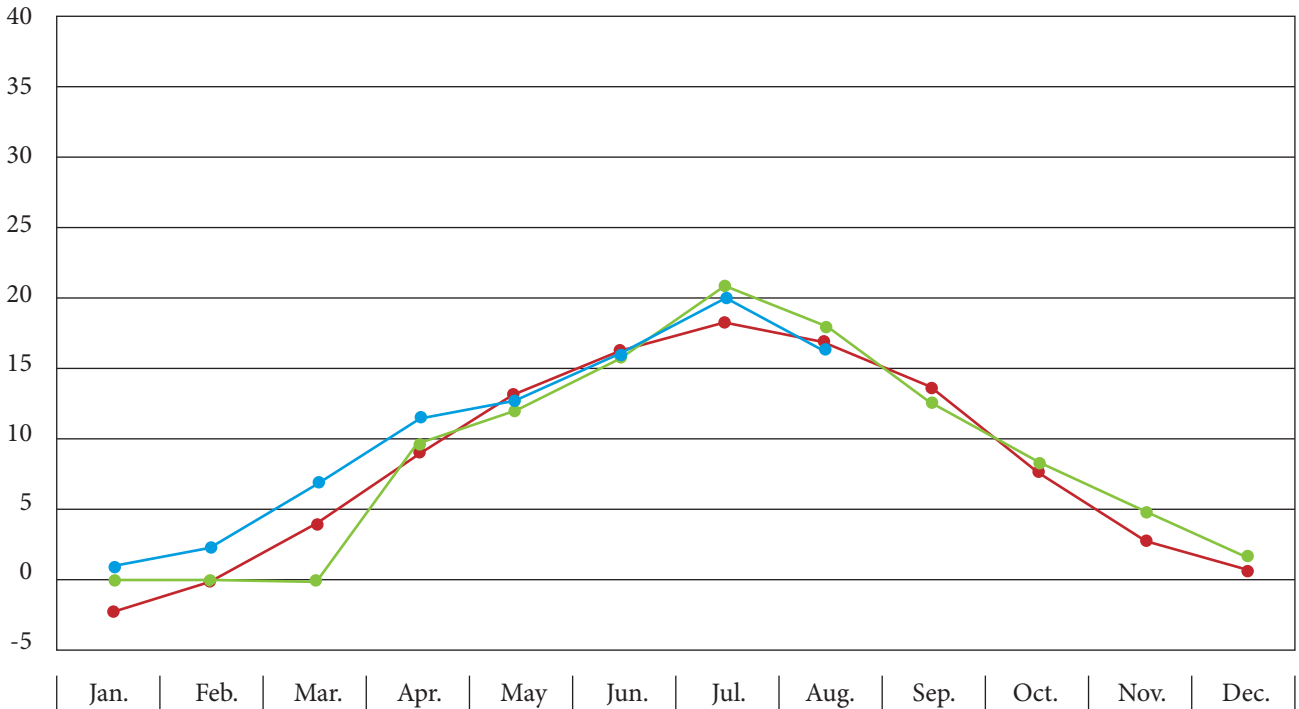
The data indicated above are accompanied by Graphs illustrating the average temperatures and the total of the precipitations per month, covering period of January, 2014 to August, 2014 (Graphs No. 1 and 2).

mm



- LONG AVERAGE
- PRECIPITATION 2014
- PRECIPITATION 2013

°C



- LONG AVERAGE
- TEMPERATURE 2014
- TEMPERATURE 2013

The character of the weather during the first trimester of 2014 was entirely exceptional, primarily owing to high temperatures. The average monthly temperatures of the first three months of this year varied on the levels above zero. Especially February and March considerably exceeded long-term average of temperature, e.g. no one day showed negative temperature in March. The first trimester was then very problematic as far as the precipitations are concerned. The whole winter period was practically without snow, even in mountains. This fact reflected itself in decrease of the level of ground water and in very low water surface of rivers in spring season.

The weather during the first two decades of April continued in the trend of the first trimester. The third decade then brought considerable warming and rains of tempest character, accompanied by hailstorms, which nevertheless did not cause any serious damages.

The temperatures in May were normal. The difference, compared to the long-term average, was just 0, 4°C. The first half of month was however rather cold, more expressive warming came only during the second half of May. On the contrary the precipitation in May was rich and expressively above-average. It reached 101mm, i.e. almost 200% of long-term normal. The rainfalls were of stormy character, with substantial differences according to individual localities. On 25th May, 2014 the municipalities of Vinařice and Kozojedy were affected by the hailstorm, which damaged approximately 40 ha of the hop gardens with the extent between 30% to 80%.

The lack of precipitation in June was critical. During two first decades it did not rain at all; the rainfalls came only on 24th and 25th June, 2014, when the precipitation of 16mm was recorded. Also the development of temperature was not favourable. Cold weather of the beginning of June was followed by tropical temperatures (between 8th and 11th June, 2014 the day temperatures went up to over 30°C). Immediately afterwards the temperature dropped, from one day to another, and the cool weather continued until the end of month.

The adverse rainfall conditions of June improved during July, when the precipitation reached 127,6mm. The rainfalls were relatively equally distributed within the whole months. The temperatures in July were also higher than the long-term average: the difference was + 2°C. During the whole month the temperatures were relatively stable without expressive oscillation. Relatively high night temperatures around 15°C in the second half of July worth noticing.

Precipitation of August, 2014 was slightly above-normal. In some localities the rainfalls were relatively rich and in some places the hop growers had to interrupt the harvest. The temperatures were below-average in August.

B/ Quality: Alpha Contents in Original, Aroma, the Appearance of the Cones, the Pests

The spring works in the hop gardens started in time or even earlier than usual in some localities. The hop growers had enough time and space for implementation of all the works in the best quality (pruning of hops, stretching and fastening of hop-leading wires). The development of the vegetation corresponded to the development of the weather. In some gardens of Sládek and Premiant varieties it was necessary to start the training already by the end of April. The Saaz semi-early red-bine hops was trained since the 5th of May, 2014. Concerning the occurrence of the pests in some localities, the incidence of flea beetle was registered. This pest was liquidated together with alfalfa snout weevil in the process of hop treatment. Due to the fact, that also in this year the preparation Actara 25 WG was permitted for the treatment of hops, there were no problems with the liquidation of these pests. Well-timed elimination of primary infection of downy mildew of hops was done primarily by the preparation Aliette 80 WG. The application of the fertilizer Farm-Fos is spreading out more and more as it helps to increase the natural resistance of plants to fungal pathogens.

Low temperatures in May slowed down the growth of hops, and therefore there were no problems with its overgrowth within the period of the training. The hop plants corresponded to the normal situation in its development and growth during that time and its state corresponded to the long-term trends. The character of climatic conditions in May was nevertheless favourable to the spreading of fungal diseases. It was recommended to carry out the second treatment by the preparation Aliette 80 WG, eventually, in case of incidence of spiky sprouts, to carry out the treatment by the preparation Curzate K. The incidence of the winged individuals of hop aphid and red spider mite was very scarce and it was not necessary to take any measures against these pests in that time.

The adverse climatic conditions in June had an impact on the growth and development of hops. The situation seemed very good in May, but in June it got worse. Critical conditions, especially as far as the rainfalls is concerned, proved again the difference between the old and newly planted hop gardens as far as the strength to face up the adverse situation is concerned. Towards the end of June majority of the hop gardens did not reach the height of the trellis. Only 40% of the hop growths reached the height of the constructions; in majority of cases it concerned the young hop gardens not older than 10 years. The situation was not satisfactory also in the gardens planted in Autumn 2013. These growths suffered by drought due to insufficiently developed root systems. Newly planted gardens were low, uneven and weak. Certain positives on this situation were the findings, that the elongation growth was continuing and that it gave the chance to the hop growths to improve the situation. Although the weather was not favourable to the development of downy mildew of hops it was nevertheless recommended to keep the sequence of the treatment against this plant disease, consisting of spraying by preparations Ortiva, Aliette Bordeaux and Ridomil Gold Plus 42,5 WP, and eventually by the preparation Curzate K. In case of hop aphid it was recommended to use – if the critical numbers of the occurrence are reached – the preparations Teppeki, Confidor 200 OD or Chess 25 WP. Against the red spider mite then the preparations Nissorun 10 WP, eventually Ortus 5SC or Vertimec 1,8 EC could be employed.

In July the growth of hops slightly improved from weaker growth in June. The reason for this improvement were favourable climatic conditions. The improvement of the state of hops could be seen primarily on young growths, which restarted the elongation growth. As a result of this condition the hops started to blossom later in comparison to the normal – only during the second decade of July. The start of flowering was very good. The hops began to flower again by the end of July. The growth of the hops was normal; some old fields nevertheless did not reach the height of the trellis. Also no serious damages caused by the hailstorm or tempest were registered. In total about 16ha of hop gardens fell down in the Czech Republic; out of that 6ha in Terschitz region, 7,5ha in Auscha region and 2,5ha in Saaz region. The attack of infection of downy mildew of hops persisted also during July. The treatment was carried out by the preparations Ortiva, Aliette Bordeaux, Ridomil Gold Plus 42,5 WP. Also preparation Curzate K was used view to short protective period. Simultaneously, already in that period the cupric preparations like Kuprikol 250 SC or Cuproxat SC were applied. At the same time the farmers used frequently the preparation Movento 150 OD, which shows not only good results against aphid, but also good effect as acaricide and successfully kills red spider mite. This pest was also liquidated by preparations Ortus 5SC and Vertimex 1,8 EC. The growers managed to keep the health condition of hops on good level.

Thanks to favourable night temperatures on the beginning of August the hops created good cones and the relation of cones towards overall habit of hop vines was very good. However, the cones grew rather fast and due to relatively frequent rains the dynamics of creation alpha bitter substances was subnormal. The harvest of hops started between 16th August and 24th August depending on individual local conditions and ripening of hops. The hop harvest was somewhere influenced negatively by abundant rains, what even caused the interruption of the gathering of hops. The hop cones were relatively well formed, closed and easy to be picked. Favourable relation of cones towards overall habit had positive influence to the share of hop admixtures, which was lower in comparison to the average of previous years. The harvest of Saaz variety finished on the majority of gardens until the 10th September, 2014.

Following table demonstrates the results of the alpha acid contents according to individual regions and varieties, as analyzed in the laboratory of Chmelařství, cooperative Žatec.

Table No. 3 – Contents of alpha in original material according to Varieties and Regions (in %) after analysis in laboratories of Chmelařství, cooperative Žatec

Region	Saaz-ST	Saaz virus free	Saaz	Sládek	Premiant
Saaz	3,01	3,22	3,13		
Auscha	2,89	2,80	2,89		
Terschitz	2,79	3,15	2,95		
Czech Rep.	2,92	3,20	3,09		

Obs.: The results of the analyses of the hybrid varieties from Auscha and Terschitz regions are still not available.

Estimation of Acreage and Yields According to Regions

The harvested acreage in 2014 is shown in following Table. The data indicated were kindly conceded by ÚKZÚZ Žatec.

Table No. 4 – The Acreage of Hop Gardens in the Czech Republic (ha):

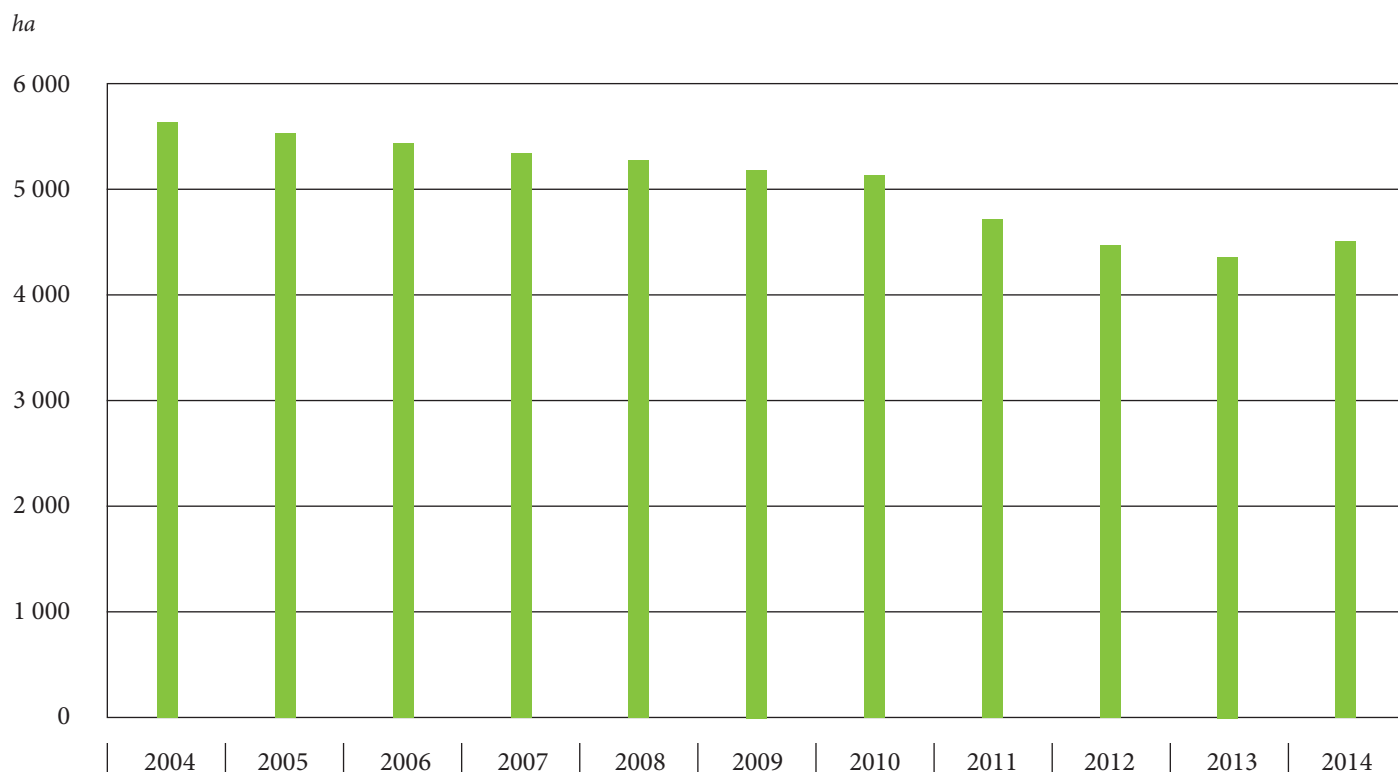
Region	up to 20.8.2014	up to 20.8.2013
Saaz	3 451	3 358
of it Saaz var	3 086	2 997
Auscha	474	457
of it Saaz var	407	392
Terschitz	535	504
of it Saaz var	401	397
Czech Republic	4 460	4 319
of it Saaz var	3 894	3 786

The decrease of the acreage of hop gardens finally stopped. Compared to 2013 the increase represented 141ha, out of that 108ha of the Saaz variety. The data relates to the 20th August of respective year, i.e. it concerns the harvested acreage. The increase of the acreage of hop gardens is – among others (low production in 2012, the loss of the gardens as consequence of floods and freezing) – the result of the systematic activity of Chmelařství, cooperative Žatec, which supports the renovation of hop gardens by financing, assists the farmers when

building new hop gardens and subsidizes the purchases of new seedlings of hops. Another source of support is the subsidies provided by the state through its grant policy and destined to the purchase of seedlings.

In order to illustrate the development of the hop gardens acreage in the Czech Republic within previous 10 years we enclose the graph of the acreage in 2004 – 2014:

Graph No. 3: The Development of the Acreage of Hop Gardens in the Czech Republic



The estimations of the hop production in the Czech Republic depended on the development of vegetation. The exact results of the crop 2014 will be known only on the beginning of December, 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”, which will be made out 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	3 451	4 450	1,29
of it Saaz var	3 086	3 700	1,20
Auscha	474	710	1,49
of it Saaz var.	407	570	1,40
Terschitz	535	840	1,57
of it Saaz var.	401	560	1,39
Czech Rep.	4 460	6 000	1,35
of it Saaz var.	3 894	4 830	1,24

FORECAST OF THE PRODUCTION IN THE FUTURE (2015 – 2016)

A/ Expected Replacement of the Varieties and Hypothetic Production of Individual Varieties:

Table No. 6 – Comparison as per the Variety Composition in 2012 – 2014:

Variety	2014 (ha)	2013 (ha)	Diff. (ha) 14/13	2012 (ha)	Diff. (ha) 14/12	Diff.(ha) 13/12
Saaz var.	3 894	3 786	+ 108	3 806	+ 88	- 20
Agnus	40	44	- 4	53	- 13	- 9
Bor	3	4	- 1	5	- 2	- 1
Kazbek	18	0	+ 18	0	+18	
Premiant	187	201	- 14	229	- 42	- 28
Sládek	270	240	+ 30	242	+28	- 2
Saaz late	15	0	+ 15	0	+ 15	
Others	33	44	- 11	31	+ 2	+13
Czech Rep.	4 460	4 319	+ 141	4 366	+ 94	- 47

B/ Expectation of the Planting of New Varieties and the Yields:

According to the data released by the ÚKZÚZ Žatec during 2013 the record breaking 406ha of hop gardens were newly planted, out of that 330ha of Saaz variety. Due to the fact that the demand after the Czech hops have increased, it can be assumed that further hop gardens will be renovated and eventually enlarged in 2015-16, so that the area of hop gardens will achieve the level of 4800ha. It is very difficult to make estimation concerning planting of new varieties. Everything will depend on the interest of the buyers in individual varieties. We are of the opinion that the offered assortment is relatively wide. The leading variety will be certainly Saaz semi-early

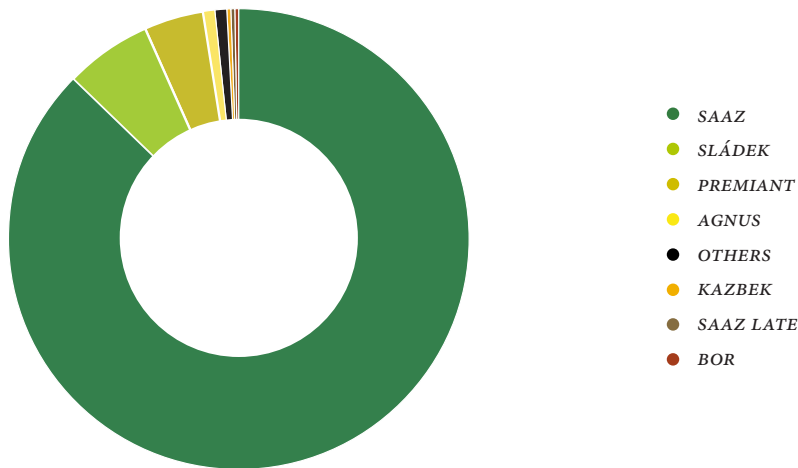
red-bine hops. Also other varieties – Sládek and Premiant - will probably maintain their positions on the market. Lately, the interest in the variety Kazbek and Saaz Late have increased. If we give some thought about the development of the yields of the Czech hops, then we must state that view to higher interest of the growers in renovation of older hop cultures the average yield per hectare should increase. Of course, we are aware of the fact that we work with biological material, which is subject to the influence of climatic conditions and certainly it will be influenced by them every year.

C/ Expected Production Areas and the Yield of Individual Varieties According to the Regions:

Table No. 7 – The Acreage of Hop Gardens in the Czech Republic (ha):

Variety	area 2014	%	area 2013	%
Saaz var.	3 894	87,30	3 786	87,66
Agnus	40	0,89	44	1,01
Bor	3	0,07	4	0,12
Premiant	187	4,19	201	4,65
Sládek	270	6,05	240	5,55
Kazbek	18	0,40	0	0,00
Saaz late	15	0,34	0	0,00
Others	33	0,76	44	1,01
Czech Rep.	4 460	100,00	4 319	100,00

Graph No. 4: Composition of Individual Varieties on Harvested Area in 2013 and 2014



TRENDS ON THE HOP MARKET

A/ The purchase movement from big buying countries

Crop 2013 was heavily affected by floods in June 2013 when several hundreds of hectares were under water for a couple of months. Non flooded hop-gardens gave average production but volumes from damaged fields were missing on the market. Also in Germany and other countries crop 2013 was hit by bad weather conditions. Such situation increased demand for all aroma varieties and also considerably increased prices on spot market (if any volume was at disposal). Since 2013 crop nearly all customers placed orders for future crops, mainly until 2018 but some of them also for further crops. Bohemia Hop is sold out from existing acreage until 2018 crop and together with Chmelařství, cooperative Žatec support farmers to increase acreage, mainly of Saaz but also of new varieties such as Kazbek and Saaz Late.

Crop 2014 seems to be slightly over average as to the volume but slightly under average as to the alpha acid content. But most probably we shall be able to fulfill all our contracted volumes. In case that farmers are able to deliver some additional quantities we have quite long „waiting list“ of potential customers for any available aroma hops.

JAPAN: many new contracts for future crops concluded

CHINA: demand is so high that we are not able to offer sufficient volumes until 2018 crop

USA: craft breweries need more and more top quality raw materials

OTHER COUNTRIES: all 4 largest brewing giants plus craft breweries are interested in future crops

B/ The purchase movement of domestic breweries

Same as last year, consumption of mainstream and lower quality brands went down, consumption of high quality brands went up, the export went up. There was a remarkable increase of number and production of craft breweries with important need of top quality hops.

C/ The estimated forward contract ratio

During autumn 2013 over 400 hectares were planted mainly to repair hop yards damaged by frosts in 2012.

During autumn 2014 once more over 400 hectares are planned to be planted to repair hop yards damaged by floods in 2013

Similar intentions for new plantation exist for 2015 and 2016
Production from existing acreage of hops is covered by contracts:

2015 crop – 100%

2016 crop – 100%

2017 crop – 100%

Hop processing line and hop storage halls

Palletizing unit

Modernization of the palletizing unit in the packaging line for hop products was installed in order to further improve the precision of putting boxes of various sizes on a pallet for a better manipulation with the pallet with hop products in the brewery.

This modernization also included new programs with a touch screen for the main operator of the line to make the process of package size changes easier and faster.

Weight for boxes

A new part of the packaging line was installed before the palletizing unit. This section will measure the weight of each box after the bags with hop pellets are put into the box and the box is closed to alert the line operator if the total weight of the box was not correct.

There is still of course the weight after the palletizing where each pallet with hop products is weighted and these data are recorded with each lot.

There is also a regular control of the weight of bags from the filling machine. The weight is also controlled by the state certification personnel – CISTA.

Hop storage halls

Roofs on cold storage halls underwent regular 5-year maintenance. There was also a new layer of isolation installed on the new cold storage hall to further decrease the energy consumption.

Floors in front of the halls received a new anti-slippery coating for a better and safer manipulation with hops and hop products.

Laboratory

New mill for preparation of samples from cone hops for hop analysis was purchased for the laboratory in order to speed up the process of hop analysis mainly during the period during and after the hop harvest.

PESTICIDE RESIDUA

A/ Supplement to the Instruction Regarding Affusion within Previous Year

Basic trends of the hop protection, as well as protection of other agriculture commodities are fully subject to the rules valid in European Union.

B/ Newly approved preparations

By comparison of Methodology of the Protection of Hops for 2013 and 2014 we recorded following enlistment of new preparations:

The name of preparation	Effective substance	Effectiveness
Korzar	oxychloride Cu	downy mildew of hops
Cuprozin Progres	hydroxide Cu	downy mildew of hops
Acramite 480 SC	bifezanate	red spider mite

C/ System of Control of Pesticide Residues

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. Connection to EUOFINS SOFIA GmbH Berlin, international certified laboratory.

D/ Protection of hops in the Crop year 2014

The protection of hops carried out by our suppliers was subject of the Methodology of the Protection of Hops for the year 2014 and of the List of the Preparations Approved for the Protection of Hops in 2014, issued for the companies Chmelařství, cooperative Žatec, and Bohemia Hop, a.s. Žatec. View to the fact, that we have agreed in the Contracts for dried hops, concluded with the suppliers, an obligatory deadline for sending of the “List” until the 31st March of the current year, we need to know eventual requirements for the adaptation of allowed chemical preparations before that day, preferably up to 28th of February of current year.