

Hop report - crop 2017



1. The situation during the crop year and the quality

A/ Development of the weather and the situation in production 2017

The monthly Hop Reports 2017, regularly published on the web sites of Bohemia Hop, a.s. Žatec - www.bohemiahop.cz are enclosed to this Report. Tables 1 and 2 indicate summarized data concerning the whole vegetation period (April–August) in 2017, compared to the same period of 2016 and to the 30 years' long-term average (1981–2010).

Table 1 – Temperature (°C)

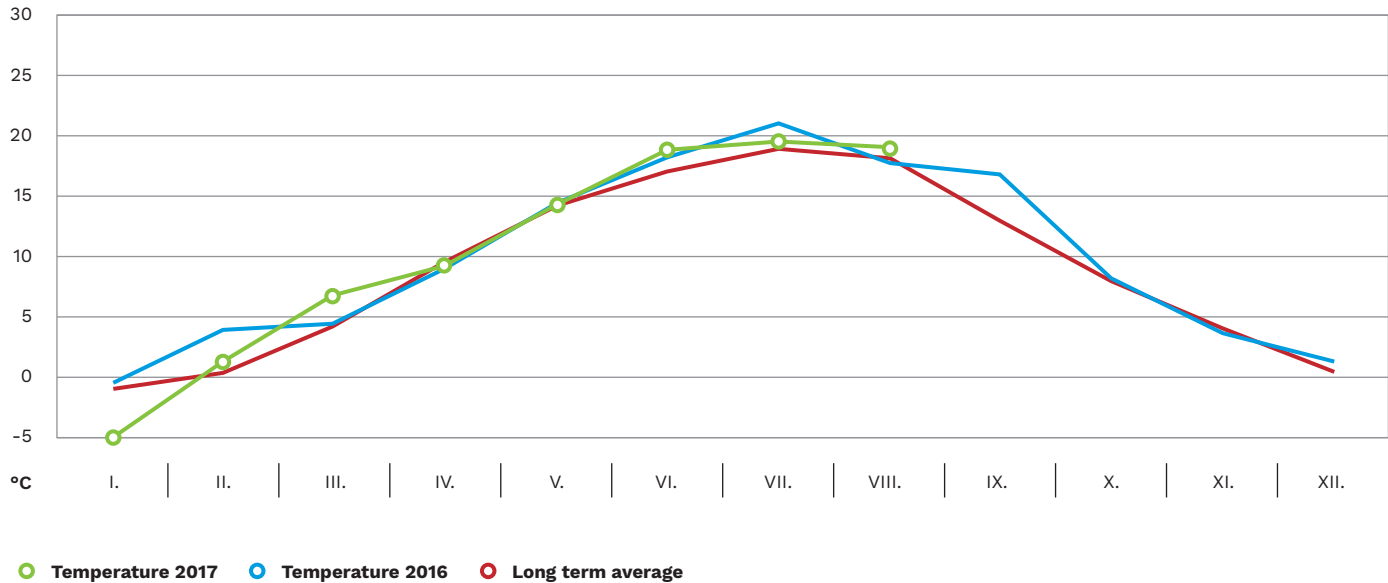
Month	Average temperature		Difference + -	30-years average	Difference + -
	2016	2017			
April	8,40	8,40	0,00	9,10	- 0,70
May	14,30	14,50	+ 0,20	14,20	+ 0,30
June	18,10	18,90	+ 0,80	17,00	+ 1,90
July	20,70	19,70	- 1,00	19,00	+ 0,70
August	18,00	19,10	+ 1,10	18,30	+ 0,70
Total	79,50	80,60	+ 1,10	77,60	+ 2,90

Table 2 – Precipitations (mm)

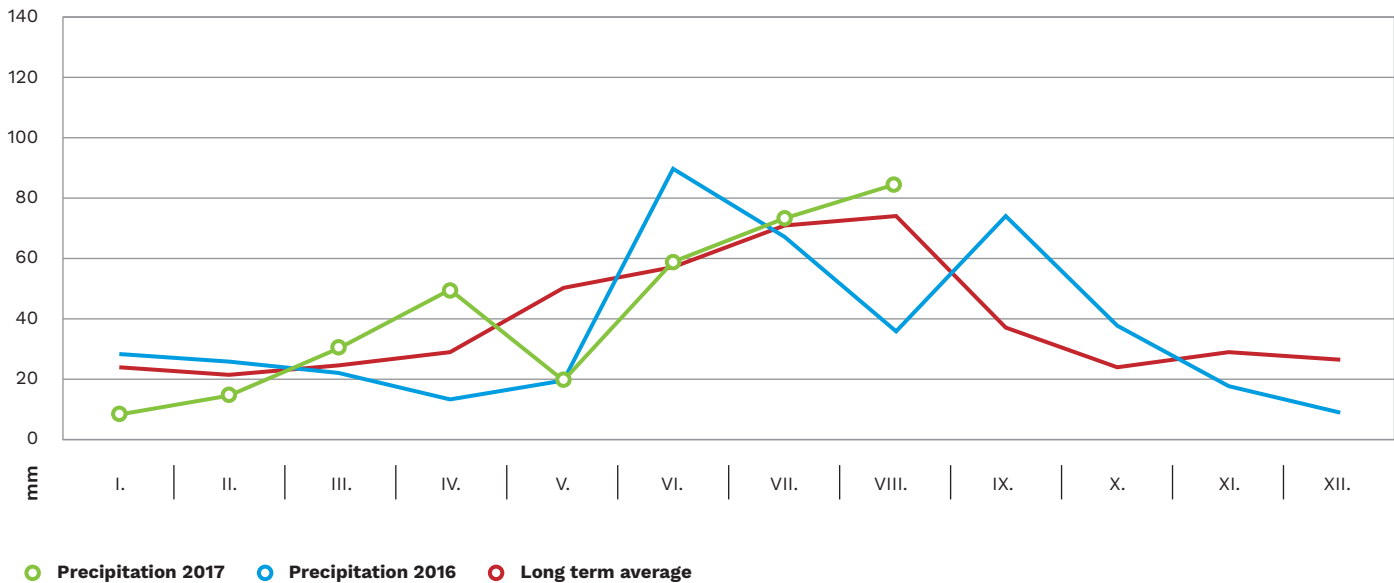
Month	Total precip. per month		Difference + -	30-years average	Difference + -
	2016	2017			
April	14,80	46,40	+ 31,60	30,70	+ 15,70
May	20,60	21,00	+ 0,40	52,00	- 31,00
June	91,00	59,40	- 31,60	59,10	+ 0,30
July	66,40	72,00	+ 5,60	69,40	+ 2,60
August	36,60	85,80	+ 49,20	70,80	+ 15,00
Total	229,40	281,40	+ 55,20	263,00	+ 2,60

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, 2017. (Graphs 1 and 2)

Graph 1 – Temperature in 2017 and 2016 compared to a long average



Graph 2 – Precipitation in 2017 and 2016 compared to a long average



The weather during the first trimester of 2017 was characterized by wide temperature variation in comparison to the first trimester of previous year, as well as to the long-term average. The highest differences were recorded in January. As for the precipitations, the first trimester was very poor. The lowest precipitations were in January - only 8 mm of the rainfalls. The temperatures in April varied below long-term average, approximately on the same level as of April 2016. The weather during the second half of that month was rather windy. The rainfalls were higher than in April of previous year and higher than the long-term average. More abundant precipitations occurred between 3rd and 4th April, 2017, when it reached 22,4 mm. First half of May was relatively cold. Especially the night temperatures were very low in that period. The warming came only by the end of the month, when the daily temperatures reached up to 30°C. Warm weather caused the hail-storms in Auscha Region, more specifically in the Polepy locality. Approx. 60 ha of hop gardens were damaged. Otherwise, May 2017 was deeply below the average, as far as the rainfalls are concerned, the total precipitations reached just 21 mm. As for the temperatures, the weather in June was above normal. The maximum temperatures varied above 20°C during the whole month. On the other side, the precipitations were very low – this June belongs among the poorest months in last years. Climatically, July was more favourable than June. The temperatures were on long-term average and without substantial extremes and the precipitations were close to the long-term average. In August the temperatures ranged above the long-term average as well as above the average of previous year. The rains came by the end of the first decade of 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. The progress of the vegetation corresponded to the development of the weather. Due to colder weather the growth of hops was considerably slow. The hops training started only after the 10th of May. Cold weather and weak growth of hop vines eliminated the differences in timing of hops pruning. The training of hops started later than usual, but it finished completely until the end of May. On majority of hop gardens the farmers effected the additional fertilizing and consequently the hilling. The delay of the vegetation as the consequence of cold weather in April and May together with high temperatures in June influenced unfavourably the elongation growth of hops. The hops stopped the elongation growth by the end of month due to above mentioned high temperatures and it started to blossom and many hop gardens, especially the older ones, did not reach the height of trellis. Bad trends in development of the habitus of the hop plants continued also in July. Only the young growths got to certain improvement. Also the phase of the hop cones creation was recorded by the older growths as first, while the young growths started to create the cones only in August. The state of hops was assessed as average to slightly below average. Climatic conditions in August, especially the rainfalls by the end of the first decade of the month, improved the state of hops, primarily by young growths of hop gardens planted by Saaz semi-early red-bine hops and above all the gardens planted with hybrid varieties. The growth of hops in the old gardens stopped by the end of July and they even did not reach the height of the trellis.

The harvest has started with individual hop growers in a relatively long time horizon between 15th August and 25th August, 2017. We expect average or slightly below-average yields. The first laboratory tests confirmed our fear concerning content of alpha bitter substances, which will be under average this year. Based on monitoring of spring pests no interventions concerning protection of hops have been effected in April. In May the chemical protection was concentrated to the elimination of downy mildew of hops (*Pseudoperonospora humuli* Miy and Takah.). The farmers applied the preparation Aliette 80 WG. They also used Curzate K in order to treat the hop gardens with higher occurrence of spike-shaped sprouts with the preparation. First winged individuals of hop aphid (*Phorodon humuli* Schrank) were seen during the second decade of May. In some areas there was applied the preparation Teppeki. Dry and warm weather by the end of May was favourable to the reproduction of red spider mite (*Tetranychus urticae* Koch). The growers were recommended to carry out the monitoring of the occurrence of that pest. Potential treatment against red spider mite should have been effected by the preparations Nissorun 10 WP or Ortus 5 SC. The development of the weather in June supported the propagation of downy mildew of hops. It was recommended to use the sequence of spraying by the preparations Ortiva, Bellis or Revus. The occurrence of hop aphid was more frequent than in previous years. In majority of cases the preparation Teppeki was used with good effect. The occurrence of red spider mite was weaker in that period. In July the conditions for the fourth spraying against downy mildew of hops were met. That is why the preparations Revus or Ortego were recommended. The fifth treatment against downy mildew of hops was then carried out between 6th August, 2017 and 15th August, 2017. By using the preparation Movento 150 OD in the first decade of July the occurrence of hop aphid was completely eliminated and the occurrence of red spider mite substantially reduced. The health state of hops in this year is very good.

Following Table demonstrates the results of alpha-bitter substances in hops according to individual regions and varieties, as analysed in the laboratory of Chmelařství, cooperative Žatec.

Table 3 – Contents of KH in original material according to varieties and regions (in %)

Region	Saaz-ST	Saaz virus free	Saaz	Sládek	Premiant
Saaz	3,10	3,20	3,15	-	-
Auscha	2,95	3,08	3,00	-	-
Terschitz	2,74	2,75	2,75	-	-
Czech Rep.			3,07	6,32	8,01

Obs.: The results of the analyses of other varieties are still not available.

C/ Estimation of acreage and yields according to regions

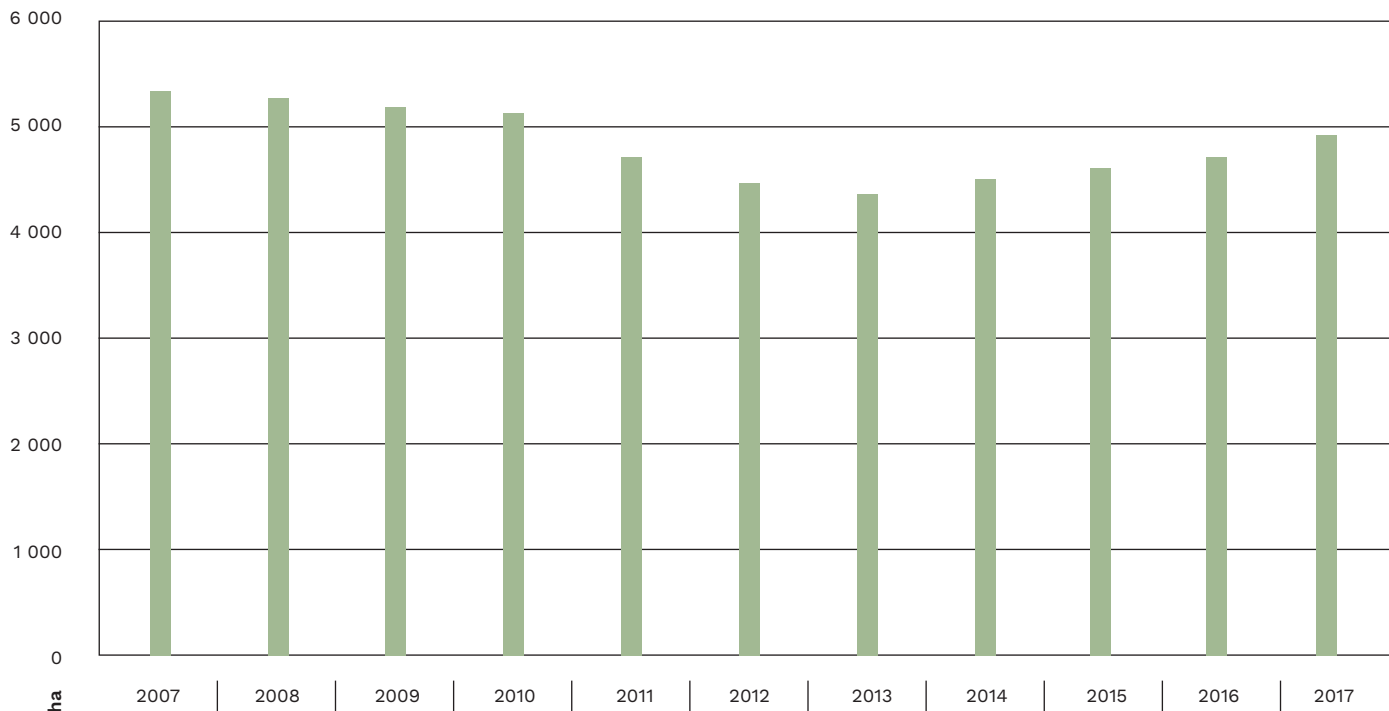
The harvested acreage in 2017 is shown in following Table. The data indicated were kindly conceded by ÚKZÚZ Žatec (data up to 20th August, 2017).

Table 4 – The acreage of hop gardens in the Czech Republic (ha)

Region	up to 20.8.2016	up to 20.8.2017
Saaz	3 692	3 815
of it Saaz var	3 301	3 390
Auscha	513	530
of it Saaz var	445	459
Terschitz	570	600
of it Saaz var	444	468
Czech Republic	4 775	4 945
of it Saaz var	4 190	4 317

The trend of the increase of acreage continued also in this year's crop. In total there were added 170 hectares of hop gardens. Majority of new hop gardens was planted with Saaz semiearly red bine hops. In order to illustrate the development of the acreage of hop gardens in the Czech Republic we enclose the graph covering the period of 2007–2017.

Graph 3 – The development of the acreage of hop gardens in the Czech Republic



It is very complicated to make the estimations of the production of hops in the Czech Republic in this year, view to differentness of the beginning of the harvest by individual growers and due to big variation among the hop gardens. The exact results will be known 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 ÚKZÚZ Žatec.

Table 5 – Estimation of the crop according to regions (total)

Region	Harvested area (ha)	Production (t)	Yield in t per ha
Saaz	3 815	4 750	1,24
of it Saaz var.	3 390	3 900	1,15
Auscha	530	740	1,40
of it Saaz var.	459	600	1,31
Terschitz	600	870	1,45
of it Saaz var.	468	600	1,28
Czech Republic	4 945	6 360	1,28
of it Saaz var.	4 317	5 100	1,18

2. Forecast of the production in the future (2018–2019)

A/ Expected replacement of the varieties and hypothetical production of individual varieties

Table 6 – Comparison as per the variety composition in 2016–2017

Variety	2017 ha	2016 ha	Diff. ha 16/15
Saaz var.	4 317	4 190	+ 127
Agnus	42	39	+ 3
Kazbek	34	21	+ 13
Premiant	165	175	- 10
Sládek	295	267	+ 28
Saaz late	44	41	+ 3
Saaz special	26	20	+ 6
Others	22	22	0
Czech Republic	4 945	4 775	+ 170

B/ Expectation of the planting of new varieties and the yields

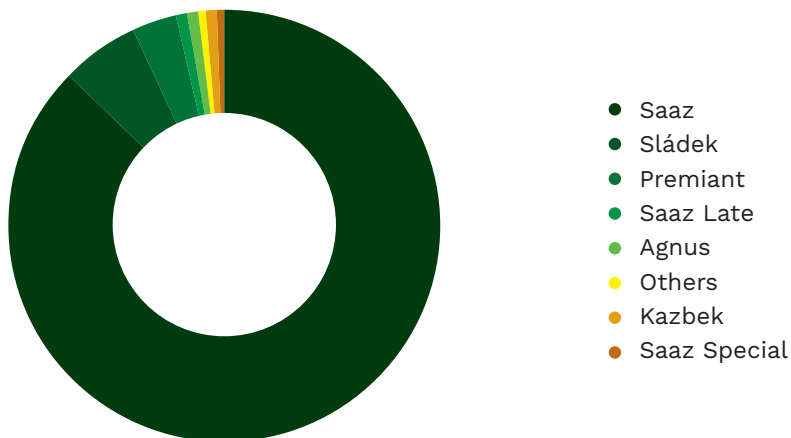
In this year the growers ordered with the producers of certified planting stock the quantity of rhizomes corresponding to about 200 hectares of hop gardens for planting in autumn 2017. As the demand for the Czech hops have increased again, the renovation and eventually enlargement of hop gardens can be expected also in 2018-2019, so the current area will be stabilized at around 5 thousand hectares. With the expansion of small breweries the interest in other varieties of the Czech origin, as e.g. Kazbek, Saaz Late, Harmonie and alternatively also Agnus and Vital continues to grow. Saaz semi-early red-bine hops will nevertheless remain the flagship of the Czech hop industry. The varieties Sládek and Premiant will also maintain their market positions.

C/ Expected production areas

Table 7 – Composition of individual varieties on harvested area in 2016 and in 2017 (ha)

Variety	area 2017	%	area 2016	%
Saaz var.	4 317	87,30	4 190	87,77
Agnus	42	0,85	39	0,81
Kazbek	34	0,69	21	0,43
Premiant	165	3,33	175	3,66
Sládek	295	5,96	267	5,60
Saaz Late	44	0,89	41	0,85
Saaz Special	26	0,52	20	0,42
Others	22	0,46	22	0,46
Czech Rep.	4 945	100,00	4 775	100,00

Graph 4 – Composition of individual varieties on harvested area in 2017



3. Trends on the hop market

A/ The purchase movement from big buying countries

Crop 2016 was a record as to the yield and average as to alpha acid content. BHC was able to fulfil all contracts and some volume was available for spot market. Due to the fact that previous crops 2012-2015 were quite low and strategical reserves by world largest players were exhausted there was high demand for free hops by big breweries plus increasing demand from middle size and craft breweries. Also in other european hop producing countries 2016 crop was very good and finally all breweries were able to cover their needs.

Demand for czech hop varieties for future crops is increasing due to higher number of craft breweries worldwide and good results of export of czech beer premium lagers. It seems that big breweries are losing their position with traditional economic brands and under the pressure of craft sector they are forced to come with innovations to the market.

Czech farmers continue in new plantations namely SAAZ variety. Our goal is to increase also acreage of „newly“ registered and approved varieties. Crop 2017 seems to be average as to the yield and slightly under average as to the alpha acid content (6th September).

Japan: for a long time no new contracts, japanese market is no more No. 1 for czech hops.

China: is now No. 1, even if total chinese beer production is going down, brands with czech hops keep their position on the market and demand for czech varieties is slightly going up.

USA: craft sector ask more czech hop varieties, especially „newly“ registered.

A/B, InBev, Asahi Europe: their flagship brands are running well new contracts until 2023 crop were concluded.

B/ The purchase movement of domestic breweries

In 2016 czech brewing industry achieved once more record especial due to massive increase of exports. Some breweries achieved their maximum capacity. Total local consumption stayed flat with increasing consumption of higher quality brands and decreasing consumption of economic brands.

Nowadays there are approx. 370 craft breweries in CZ, all are basically producing bottom fermented lagers with high dosage of czech hop varieties.

C) The estimated forward contract ratio

- Crops 2018–2020: 100%
- Crops 2021–2022: 80%
- Crop 2023: 50%
- Crops 2024–2025: 20%

4. Quality Control:

A/ The change of technology for crop 2017

Chmelařství, cooperative Žatec has this year made major investments in the storage and processing. These steps followed previous regular investments into the processing plant. The investments this year included a new cold storage for hops from farms. Chmelařství thus reacted on the increase of hop acreage and extended the cold storage capacity to be still able to store all the purchased hops and hop products in cold storage.

Large investments were also realized in processing line, the main new change is new packaging machinery equipped with new Japanese weight system. This change partly reacted also on the trend of higher needs of smaller packages for craft industry but it will bring benefits to all processed hops.

Further investments in the processing line included change of vital part of the cooling system for the processing of pellets 45 and new stocking system for foils and cartons in the plant for better and easier handling of material. Within the whole plant there was a substantial maintenance or rebuilding of many floor and roof areas. For the new season we have also new forklifts to handle the hops from farmers trucks to cold storage, new truck that transports the hops from farmers to cold storage and several pieces of new equipment for our laboratory.

5. 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 used pesticides

By comparison of the Methodology of the Hop Protection in 2017 and 2016 we registered the inclusion of new preparations in 2017:

Name of Preparation	Active Substance	Effectiveness
Airon SC	oxychloride + hydroxide Cu	downy mildew of hops
Badgde WG	oxychloride + hydroxide Cu	downy mildew of hops
Cobran	hydroxide Cu	downy mildew of hops
Defender Dry	hydroxide Cu	downy mildew of hops
Funguran Progres	hydroxide Cu	downy mildew of hops
Orvego	dimethomorph	downy mildew of hops
Kumar	potassium bicarbonate	powdery mildew

The preparations excluded from the Methodology 2017 in comparison to 2016:

Name of Preparation	Active Substance	Effectiveness
Korzar	oxychloride Cu	downy mildew of hops
Alibis Ultra	tebuconazole	powdery mildew
Lynx	tebuconazole	powdery mildew
Ornament 250 EW	tebuconazole	powdery mildew
Horizon250 EW	tebuconazole	powdery mildew

C/ Control system for 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 residues, so that it goes on in compliance with the present trends. Connection to EUROFINS SOFIA GmbH Berlin, an international certified laboratory, continues and in compliance with the facilities of the laboratory we extend also the spectrum of analyses of active substances. Simultaneously, in this year we extended the cooperation with Chmelařský institut s.r.o. Žatec, which is equipped – since previous year - with new laboratory facilities for analyses of pesticide residues.

D/ Protection of hops in the crop year 2017

The protection of hops carried out by our suppliers was subject to the Methodology of the Protection of Hops for the year 2017 and of the List of the Preparations Approved for the Protection of Hops in 2017, issued for the companies Chmelařství, co-operative 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 possible requirements for the adaptation of allowed chemical preparations before that day, preferably up to 28th of February of current year.

Prepared by Jaroslav Hájek
Saaz, 7th September, 2017