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Sodelavci Inštituta za hmeljarstvo in pivovarstvo Slovenije ob 60-letnici

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60 LET INŠTITUTA ZA HMELJARSTVO IN PIVOVARSTVO SLOVENIJE

*Martina Zupančič, direktorica
Inštitut za hmeljarstvo in pivovarstvo Slovenije*

Vsi jubileji so neka ločnica, ko se še bolj zavemo hitrega teka časa in hkrati tudi vedno ozremo na prehojeno pot.

Morebiti kdo poreče, da ob trenutni svetovni krizi v hmeljarstvu ni ravno primerno obhajati jubileje. Po mojem mnenju pa nam prav taki dogodki dajejo moč za poti preko ovir, ki jih je vsaka generacija do sedaj večinoma uspešno premagala.

Še vedno lahko z velikim občudovanjem sprejemamo odločitev hmeljarjev sredi prejšnjega stoletja, ki so že sedem let po drugi svetovni vojni spoznali, da lahko le napredek in lasten razvoj omogočita hmeljarstvu Slovenije obstoj na svetovnem trgu.

Zgodovina gojenja hmelja je v Sloveniji res stara že skoraj 1000 let, vendar pa so pravi industrijski prijem v pridelavi nastali pred dobrimi 150 leti.

Iz napak, ki so jih naredili prvi hmeljarji, so se z leti naučili, da hmeljarstvo zahteva specifično znanje, ki ni vedno neposredno prenosljivo iz sorodnih kultur. Iz takih razmišljanj je nastala ideja o ustanovitvi Inštituta za hmeljarstvo. In to v času, ki temu ni bil ravno naklonjen, še sploh pa ne za relativno skromen obseg takratnih 1500 ha. Še bolj presenetli dejstvo, tako za takratni kot današnji čas, da so bili hmeljarji kot prvi pripravljeni svoj razvoj tudi sami v celoti financirati. To so nedvomno storili lažje, ker jim je inštitut od svojega nastanka nudil znanje za uspešno in konkurenčno pridelavo, kar je bilo vse do danes še najpomembnejše. Hmeljarji so ves čas vedeli, da je treba znanje izpopolnjevati vedno znova in da je pri hmelju toliko specifičnih odločitev znotraj vsakoletne sezone pridelave, da tudi najbolj izkušeni potrebujejo posvet in nasvete strokovnjakov.

Pred petintridesetimi leti se je kemijski oddelek inštituta v delu specializiral tudi za pivovarstvo kot končnega največjega porabnika hmelja. Takrat se je razširilo tudi ime inštituta.

Zaradi rednih srečanj v sezoni pridelave s pridelovalci, ki običajno nimajo samo pridelave hmelja, ampak tudi drugo kmetijsko proizvodnjo, se je inštitutski delokrog razširil na druga področja kmetijstva, in to za območje

60TH ANNIVERSARY OF SLOVENIAN INSTITUTE OF HOP RESEARCH AND BREWING

*Martina Zupančič, director
Slovenian Institute of Hop Research and Brewing*

Every anniversary represents a turning point, because it is then that we become aware of the sands of time, and look back to the path already travelled.

Some might say that in the times of crisis anniversaries should not be celebrated. In my opinion, it is events like these that give us the strength to overcome all the obstacles, just as they were more or less successfully transcended by every generation so far.

We can still admire the decision of the hop growers from the beginning of the 1950s. Only seven years after World War II, they realized that only through progress and personal development, would the hop industry be able to prevail in the global market.

Hops cultivation in Slovenia has a rich history, dating back a thousand years, through industrial production methods were not introduced until 150 years ago.

With time, hop growers have learnt from the mistakes of their forefathers. They realized that growing hops requires specific know-how, which cannot be transferred directly from neighbouring cultures. Such considerations paved the path for the foundation of the Slovenian Institute for Hop Research. It was founded in an unfavourable period, and the then available cultivation areas only measured approx. 1500 ha. Even more surprising is the fact that, in the past and as well as the present, hop growers have always been ready to finance their development by themselves. The reason for this is that ever since its founding, the Institute has provided growers with the knowledge required for successful and competitive production, which has been the biggest factor for success till today. Hop growers have never forgotten that knowledge must be updated continuously, and that in the hop industry, even the most experienced growers must seek professional advice due to the sheer amount of specific decisions required annually.

35 years ago, a section of the Institute was also specialized in brewing, which constitutes the largest consumer of hops. It was then that the name of the Institute was adjusted, as well.

osrednje Slovenije od Dravograda do Sotle.

Kot znanstvenoraziskovalna institucija je inštitut v svojem času oral ledino in se izpopolnjeval na nivoju Slovenije predvsem na področju varstva pred boleznimi in škodljivci, pedologije in namakanja. To je nadgradil in dela tudi danes ter nudi podporo državnim organom, opravlja pedagoško delo z mladimi kadri srednjih šol in univerz ter skrbi za izmenjavo raziskovalcev po vsem svetu.

Upam, da ni nesprejemljivo, če omenim le nekaj dosežkov našega inštituta skozi čas.

Razvoj in znanje kot krona raziskovalne dejavnosti nista nekaj, kar bi v laboratorijih, rastlinjakih ali na polju nastajalo samo od sebe. Inštitut so ljudje, in to vsi tisti, ki so se v teh letih posvetili raziskovanju in svetovanju na področju hmeljarstva in celotne rastlinske pridelave.

To je bila trnova pot od izbora primernih sort in posodobitve tehnologije za naše pridelovalne razmere. Z nastankom prve A-serije novih sort hmelja v začetku sedemdesetih let se je odprla pot, po kateri so tri desetletja prihajale kar tri serije novih sort, ki so hmeljarjem omogočile doseči 3-odstotni svetovni tržni delež. Ob ekonomični tehnologiji, ki je z opore na hmeljevkah prešla na žičnice, kjer je tudi žično oporo nadomestila polipropilenska vrvica, smo danes tik pred uporabo novih biološko razgradljivih vodil.

Hmeljarji bi si na sredini prejšnjega stoletja verjetno težko predstavljali le nekaj delovne moči, s katero lahko danes ob pomoči obiralnih strojev oberejo in posušijo hektarje hmeljskih nasadov in tone hmeljnih kobul.

As a result of regular in season meetings of farmers, who also deal, besides hop growing, with other agricultural production, the scope of activities of the Institute was extended to other agricultural branches and covers the central Slovenian area from Dravograd to the river Sotla.

With its operation, the Institute, being a scientific and research institution, has been involved in ground-breaking activities while constantly growing at the Slovenian level especially in the field of disease prevention and pest control, soil sciences, and irrigation. The Institute has contributed greatly to these areas and has provided support to state authorities, has performed pedagogical work involving young personnel from middle schools and universities, and has cooperated with researchers around the World. I feel that at this point, it would be necessary to mention certain achievements of our Institute from the past.

Development and knowledge are at the top of the list of research activities, as they cannot simply be collected in laboratories or grown in greenhouses, or fields. The Institute consists of people. This includes every individual who has until today been involved with research and advisory services in the field of hop growing and the entire agricultural production.

The path, from the selection of suitable varieties to technology modernization, has been paved with hardship. With the breeding of the first A-group hop varieties in the beginning of the 1970s, which saw three decades of introductions of three new series of varieties, the hop growers have managed to obtain a market share of 3%. The technology has been economized with the introduction of wire support and its subsequent replacement with polypropylene strings, and today, we are on the way of introducing a new biodegradable twine.



Hop growers from the 1950s could not even begin to imagine that in the future such a small number of labourers, by using machinery, would be able to harvest and dry tone of coins from the hectares of hop fields. It is true, however, that people are not anymore so connected, and that some songs have already been forgotten. Back then, *Verticillium* and viroids were unknown in hop cultivation, and it was our Institute that was the most successful in battling those

Res pa je, da je pesmi in povezanosti med ljudmi veliko manj. Takrat tudi še niso imeli problemov z verticilijem in viroidi v hmelju, ki jim je prav naš inštitut na vsem svetu prišel še najbolj do živega. Tako zadnja leta proizvajamo kot prvi na svetu ne samo brezvirusne, ampak tudi brezviroidne rastline.

Verjetno 60-letnico obhajamo ravno v času najhujših kriz v celotnem gospodarstvu, odkar obstaja inštitut, vendar upam, da nam bo prav pregled dosežkov preteklega obdobja dal zagon za iskanje novih rešitev, da bomo uspeli ohraniti hmeljarsko panogo in našli tudi nove možnosti za delo našega inštituta. Zato je prav, da izredno dobro opravljen zgodovinski pregled dogajanj ob 50-letnici sedaj nadgradimo samo še z zadnjimi desetimi leti.

Kaj se nam je v tem času zgodilo?

- Leta 2002 so se ustanoviteljske pravice našega inštituta prenesle na Vlado Republike Slovenije, postali smo javni zavod,
- posodobili smo skoraj vso laboratorijsko opremo,
- praznovali smo 35-letnico Vrta zdravilnih in aromatičnih rastlin,
- pridobili smo nov rastlinjak,
- posodobili smo opremo poskusnega posestva na 27 ha,
- obnovili smo vozni park terenskih avtomobilov,
- z nami so bili in so še številni novi mladi raziskovalci,
- osnovali smo lastno raziskovalno skupino,
- sodelujemo še v štirih raziskovalnih programskih skupinah in številnih državnih in mednarodnih projektih,
- vpisali smo dve novi sorti hmelja, poteka pa že prijava naslednje serije novih sort z žlahtnimi in specifičnimi aromami,
- staro sušilnico smo odstopili za namen Ekomuzeja hmeljarstva in pivovarstva Slovenije ter
- obnovili gensko banko hmelja, zdravilnih rastlin in škodljivih organizmov.

Naše delo bo v bodoče usmerjeno pretežno na področja varovanja okolja, predvsem vode in namakanja, varstva rastlin, pristnosti rastlinskih proizvodov v smislu varne hrane za jutri ter novih sort hmelja, ki vključujejo nove želje glede okusov in tehnologij piva ter žlahtnjenja tudi drugih kmetijskih in posameznih zdravilnih rastlin.

Kot vse doslej bo izrednega pomena tudi prenos našega znanja preko diplomskega in podiplomskega študija na mladi rod in tudi izobraževanje uporabnikov skladno z zakonodajo.

infections on the global level. Therefore, in the past years, we have been the leading producer of not only virus-free but also viroid-free plants.

The 60th anniversary will be celebrated in the middle of the severest economic crisis in the last sixty years. However, I do hope that by reviewing our achievements from this past period, we will find the drive to seek out new solutions aimed at preserving the hop sector and establishing new possible activities at our Institute. It would therefore be appropriate, in consideration of the review of milestones at the 50th anniversary, to supplement that list with the achievements of the last decade.

What has happened:

- 2002 – transfer of founder rights to the Republic of Slovenia; transformation into a public agency
- replacement of most of the laboratory equipment,
- celebration of the 35th anniversary of the Herbal Garden,
- construction of a new greenhouse,
- enlargement of the testing field to approx. 27 ha,
- modernization of the off-road vehicle fleet,
- successful past and present cooperating with young researchers,
- introduction of a proper research team,
- cooperation in four research programme groups and in numerous government and international projects,
- registration of two new hop varieties; a new series of noble and special aroma hop varieties is under development,
- the old kiln was donated to the Hop and Brewing Ecomuseum Slovenia, and
- the obsolete hops, herbs, and pests gene bank was updated.

In the future, our activities will be aimed especially at environmental protection, particularly the water and irrigation, protection of plants, availability of plant products for a safe food production in the future, and new hop varieties, which consider new requirements and brewing technologies, and last but not least, the breeding of other agricultural plants and individual herbs.

As before, the transfer of knowledge through BA and MA study programmes to the younger generations, as well as the education of individuals in accordance with the legislation, will be of almost importance.

We are very proud that during the 60th anniversary,

Zelo smo ponosni, da nam je uspelo prav ob 60. jubileju hmeljarjem ponuditi tudi možnost nacionalne poklicne kvalifikacije za hmeljarja.

Ob koncu lahko zaključim, da nas na inštitutu družijo želja po raziskovanju, skupnem delu in izobraževanju ter ljubezen do tiste rastline, ki je botrovala naši ustanovitvi. Na nas in naših uporabnikih pa je dolžnost, da z raziskavami in njihovim prenosom v prakso omogočimo pridelavo hrane in surovin zanjo v takem okolju, ki ga bomo lahko brez slabe vesti zapustili naslednikom.

Ob poznavanju in upoštevanju preteklosti, razumevanju sedanjosti ter spoštovanju vseh, ki so kakorkoli prispevali k delu in delovanju inštituta, bomo imeli možnosti tudi za praznovanje prihodnjih obletnic.

we are able to offer to hop growers the possibility of enrolling into the national hop grower vocational training programme.

In the end, I can safely conclude that the employees of the Institute share the desire for research, team work and education, and the love for the plant that gave grounds for our founding. It is up to us and our clients to provide for food production and the required resources through research and the dissemination of results within an environment that will be proud to hand down to future generations.

And if we review and consider the past, understand the present, and respect everybody who has ever contributed to the activities and operations of the Institute, we will surely be able to also celebrate future anniversaries.



PRIDELAVA HMELJA SKOZI ČAS

Joško Livk

Inštitut za hmeljarstvo in pivovarstvo Slovenije

Pričetki hmeljarstva v Sloveniji segajo daleč v dvanajsto stoletje. Z intenzivnejšim in načrtnejšim gojenjem hmelja pa se je pričelo leta 1876, ko so aklimatizirali angleški Faggles in pričeli pridelovati še sedaj znano sorto – prvovrsten Savinjski golding. Pridelava hmelja se je pozneje intenzivno razširila in dosegla do pričetka prve svetovne vojne leta 1914 okoli 1800 ha. Te površine so se med vojno zmanjšale na približno 600 ha do leta 1918. Ker takoj po vojni cene hmelja niso bile zelo zanimive, so se površine počasi povečevale in prišle na stanje izpred vojne leta 1926. Po tem letu so cene hmelja zelo zrasle, zato so se temu primerno tudi površine hmeljskih nasadov povečevale in dosegle leta 1929 rekordnih 2835 ha in pridelanih cca 3300 ton hmelja. Tudi po tem letu je vse do danes odločilno vlogo glede površinske zastopanosti nasadov hmelja odigrala cena hmelja. Višja je bila cena, bolj se je hmelj sadil in obratno. Število hmeljarjev se je do druge svetovne vojne povzpelo na 4000. Bili so združeni v enotni Hmeljarski zadrugi, ki je zastopala vse hmeljarje in tako tudi nastopala na trgu. V preglednici 1 so prikazani podrobni podatki glede pridelave hmelja v obdobju od leta 1938 do leta 1945.

Ekstremno zmanjšanje hmeljarske pridelave od leta

HOP CULTIVATION THROUGH HISTORY

Joško Livk

Slovenian Institute of Hop Research and Brewing

The beginnings of hop growing in Slovenia date back to the 12th century. Though intense and planned hop growing was introduced in 1876, when the English Faggles was acclimatized, and the production of the then unknown Savinjski golding had started. Hop growing was spread intensively, and involved approx. 1800 ha (hectares) of land before the beginning of World War I in 1914. The area of available fields was reduced to approx. 600 ha by 1918. Immediately after the war, hop prices were low, and were finally raised to the pre-war level in 1926. After 1926, hop prices increased, and as a result, more and more land was used for hop cultivation. In 1929, hop cultivation fields measured a record 2835 ha, from which 3,300 metric tons of hops were harvested. Even after 1929, the price of hops played a major role in the hop industry in terms of available hop cultivation fields. Hops were cultivated more intensely when prices increased, and vice versa. The number of hop growers reached 4,000 after World War II. They even formed a Hop Grower's Cooperative, which represented the interest of every hop producer in the market. Table 1 contains detailed data on the production of hops from 1938 to 1945.

Preglednica 1: Površine hmeljskih nasadov in pridelek v Sloveniji od leta 1938 do leta 1945 (za primerjavo je navedeno tudi leto 1929 z največjo površino v vsej zgodovini hmeljarstva v Sloveniji)

Table 1: Area of hop fields in Slovenia between 1938 and 1945, including yield. (The year 1929 has been indicated for comparison, as it was in that year that the area of hop cultivating fields was the greatest in the history of Slovenia)

Letnik hmelja <i>Hop year</i>	Prvoletniki <i>New plants</i>	Rodni nasadi <i>Yielding fields</i>	Skupaj rodni nasadi in prvoletniki <i>Total yielding + new plants</i>	Pridelano <i>Harvest</i>	Kg/ha
	(ha)	(ha)	(ha)	(t)	
1929	197	2638	2835	3300	1164
1938	112	1988	2100	1465	697
1939	133	2317	2450	2300	938
1940	157	2412	2569	2200	856
1941	126	1576	1702	1490	875
1942	30	635	665	680	1022
1943	22	620	642	649	1010
1944	13	620	633	597	943
1945	12	625	637	303	475

1940 do leta 1942 je rezultat prisilnega reduciranja hmeljskih nasadov nemškega okupatorja med drugo svetovno vojno. Podobno je bilo tudi med prvo svetovno vojno, kar pomeni, da je bila vsakokratna oblast pred osvoboditvijo mačeha hmeljarjev.

Zanimiv je tudi obnovitveni načrt iz leta 1946, ki je predvideval, da naj bi se površine hmeljišč povečale v roku petih let z dobrih 600 ha zopet na 3000 ha. Za pridelavo in odkupom je takrat stala tudi država. Vendar se ti načrti niso povsem uresničili, saj so se skupne površine s hmeljem do leta 1950 povzpele na dobrih 1500 ha in potem na tem nivoju ostale kar nekaj let. Te površine je obdelovalo okoli 3000 hmeljarjev, katerih število se je proti letu 1965 zmanjšalo na 2500. Leta 1960 so hmeljišča obsegala okoli 2300 ha in so se na tem nivoju obdržala kar nekaj let. Iz navedenega lahko vidimo, da je posamezni hmeljar obdeloval v povprečju slab hektar hmeljskih površin. Od leta 1965 so površine in pridelki različno variirali, kar je razvidno iz preglednice 2.

Če primerjamo preglednici 1 in 2, vidimo, da so se povprečni hektarski pridelki v dvajsetih letih povečali za

A substantially decreased hop production between 1940 and 1942 was the result of the forced reduction of hop fields by the German occupiers during World War II. There was a similar occurrence during World War I. That meant that the invading authorities were not very favourable towards the hop growers.

Also interesting is the renewal plan from 1946, which foresaw that in the period of just over five years, the area of hop cultivation fields would be increased back to 3,000 ha from the then 600 ha. Back then, the government had a say in the cultivation as well as the purchase of the crop. These plans were not realized to their full extent though, as the total hop cultivating area increased to over 1,500 ha, where it remained for several years. These fields were worked by approx. 3,000 farmers; towards 1965, their number decreased to 2,500. In 1960, the hop fields comprised approx. 2,300 ha, and the number remained unchanged for a period. From the above, it is evident that an individual farmer only worked under 1 ha of hop fields on average. Since 1965, the field area and yields have varied, as is evident from Table 2.

Preglednica 2: Površine hmeljskih nasadov in pridelek v obdobju od leta 1965 do leta 1977

Table 2: Area of hop cultivating fields, including yields, between 1965 and 1977

Letnik hmelja <i>Hop year</i>	Prvoletniki <i>New plants</i>	Rodni nasadi <i>Yielding fields</i>	Skupaj rodni nasadi in prvoletniki <i>Total yielding + new plants</i>	Pridelano <i>Harvest</i>	Kg/ha
	(ha)	(ha)	(ha)	(t)	
1965	245	2114	2359	2790	1182
1966	150	2194	2344	3049	1300
1967	224	2221	2445	3035	1241
1968	254	2316	2570	3010	1171
1969	150	2401	2551	3384	1326
1970	ni podatka	ni podatka	2512	2595	1033
1974	ni podatka	ni podatka	2457	3060	1245
1975	ni podatka	ni podatka	2366	2900	1225
1976	62	2240	2302	2573	1117
1977	138	2060	2198	2719	1237

okoli 20 %. Rezultat tega so prav gotovo v veliki meri doprinesle nove opore hmelja zaradi optimalnejše izrabe ravnega prostora, ki so bile nekje do leta 1950 samo na hmeljevkah. V obdobju od leta 1950 do leta 1960 pa so hmeljevke, ki jih je bilo potrebno vsako leto postavljati na novo, vedno bolj zamenjavale fiksne hmeljske žičnice, ki so bile v začetku samo lesene. V obdobju od leta 1960 do leta 1970 se je postavilo veliko kompleksov hmeljskih žičnic, katerih drogovci so bili betonski. Večina teh stoji še danes.



Hmelj na poti od hmeljevke do žičnice (foto: arhiv IHPS)
Transporting hops: From the bine to the trellis (photo: the Institute archive)

Vseskozi od ustanovitve pa je razvoj na področju hmeljarstva aktivno spremljal in vodil Inštitut za hmeljarstvo in pivovarstvo Žalec, ki je poleg strokovnega dela na oporah razvijal tudi selekcijo in pridobivanje novih sort hmelja z večjimi pridelki in boljšo odpornostjo na pridelovalne pogoje. Tako je bilo leta 1972 poleg Savinjskega goldinga posajeno v slovenskih hmeljiščih že 106 ha hmeljišč z novimi sortami (od teh je bilo kar 79 ha posajenih v letu 1972). Večina nasadov z novimi sortami je bilo posajenih s sortama Atlas in Ahil, nekaj manj je bilo Aurore, najmanj pa Apolona. Ker so to sorte, ki dozorevajo pozneje kot Savinjski golding, je s tem omogočeno lažje spravilo pridelka, ker ni potrebno obrati vsega naenkrat. Zato se je povpraševanje po teh sortah v naslednjih letih zelo povečalo. Tako lahko vidimo v preglednici 3, da je čedalje vidnejše mesto v pridelavi pričela zavzemati sorta Aurora in tudi ostale sorte. Površine Savinjskega goldinga pa so se zelo zmanjševale nekje do leta 1981 in ostale na teh hektarjih celo desetletje.

Tako kot so se okoli leta 1970 pojavile nove sorte – tako imenovani A-kultivarji (Aurora, Atlas, Apolon in Ahil), so

If we compare Tables 1 and 2, it is clear that the average hop yield has increased by 20% on average in the last 20 years. Surely, these results are primarily caused by new hop support technologies, which were introduced around 1950, and enable a more optimal use of land. In the period from 1950 to 1960, the hop growing poles which had to be positioned annually were more and more replaced by

fixed wire trellises. In the period between 1960 and 1970, numerous trellises with concrete supports were constructed. Most of them are still in use today.

Ever since its foundation, the development of the hop sector was monitored and led by the Institute of Hop Research and Brewing in Žalec. The Institute concentrated on, besides special activities involving hop support, the development and selection as well as breeding, of new hop varieties with improved yields and better resistances to adverse growing conditions. In 1972 in Slovenia, new varieties were already grown in 106 ha of hop fields, along with the Savinjski golding (almost 79 ha were planted in 1972). Most new variety plantations included the Atlas and Ahil varieties; less popular was Aurora, and even less Apolon. Since these varieties will mature later than Savinjski golding, harvesting was expedited, because the need to harvest all the crops at the same time was eliminated. As a consequence, the demand for these varieties increased substantially in the following years. As is evident from the table 3, Aurora, as well as other varieties, was being more widely cultivated. The fields intended for Savinjski golding cultivation were

Preglednica 3: Površine hmeljišč v Sloveniji od leta 1978 do leta 1990 glede na posamezno sorto in pridelki hmelja

Table 3: Area of hop fields in Slovenia between 1978 and 1990 per variety, including yield

Letnik hmelja Hop year	Savinjski golding	Aurora	Atlas	Apolon	Ostale sorte Other varieties	SKUPAJ TOTAL	Pridelek skupaj Total yield	Kg/ha
	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(t)	
1978	1369	357	225	131	15	2097	2918	1391
1979	1236	491	247	117	19	2110	2770	1312
1981	996	850	283	118	24	2271	3902	1718
1982	949	1007	281	111	38	2386	4115	1724
1985	908	1192	208	105	37	2450	4022	1641
1987	963	1190	133	79	129	2494	4354	1745
1989	1011	1227	71	39	122	2470	3246	1314

se v letu 1980 pojavili B-kultivarji (Bobek, Blisk in Buket), kar je lepo vidno v preglednici 4.

V letu 1989 so se pojavili tudi že C-kultivarji, med katerimi so bile sorte Celeia, Cerera, Cicero in Cekin, ki so v preglednici 4 vpisane med ostalimi sortami. Od

being reduced until approx. 1981; their area remained unchanged for a whole decade.

Similarly to the 1970s which saw the origination of the so called A-varieties (Aurora, Atlas, Apolon, and Ahil), in the 1980s, new B-varieties were bred (Bobek, Blisk, and

Preglednica 4: Gibanje hmeljskih površin in pridelka v obdobju od leta 1990 do leta 2000

Table 4: Area of hop cultivating fields, including yields, between 1990 and 2000

Letnik hmelja <i>Hop year</i>	Savinjski gol- ding	Aurora	Atlas	Apolon	Bobek	Blisk	Buket	Ostale sorte <i>Other varieties</i>	SKUPAJ <i>TOTAL</i>	Pridelek skupaj <i>Total yield</i>
	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(t)
1990	977	1240	62	38	43	54	20	10	2444	3670
1992	824	1239	45	16	111	40	19	84	2378	3575
1994	683	1275	38	6	251	33	14	116	2416	3541
1996	533	1276	26	5	326	45	13	135	2359	3606
1998	350	1195	1	0	314	11	3	123	1997	3160
2000	252	1147	1	0	186	4	2	181	1773	1805

teh se je najbolj razširila sorta Celeia, katere je bilo leta 2000 že 54 ha. Prav tako sta se v letu 1991 pojavili na pridelovalnih površinah v Sloveniji tudi sorti Vojvodina (19 ha) in Neoplanta (11 ha), ki sta prav tako zajeti v preglednici pod ostalimi sortami in sta v letu 1997 že izginili z naših hmeljišč. V letu 1996 se je pojavila tudi sorta Hallertauer Magnum, ki so jo leta 2000 pridelovali že na 78 ha.

Pa pogledjmo, kaj se je dogajalo s pridelavo hmelja v Sloveniji v zadnjih dvanajstih letih (preglednica 5).

Tudi število hmeljarjev se je z leti precej spreminjalo, kar je razvidno iz preglednice 6.

V preglednici so navedeni samo aktivni hmeljarji. V letu 2012 je poleg teh 117 hmeljarjev še 21 takšnih, ki imajo v Registru kmetijskih gospodarstev prijavljene samo premene in nobenega nasada hmelja. Torej je bila leta

Buket), as is evident from the table 4.

1989 saw the origination of C-varieties, including: Celeia, Cerera, Cicero, and Cekin, which are included in the table above under the title "Other varieties". Today, the Celeia variety is the most common, and was already grown on 54 ha of hop fields in 2000. Also in 1991, two new varieties Vojvodina (19 ha) and Neoplanta (11 ha) were introduced to Slovenia, and are also included under the title of "Other varieties" in the table above; by 1997, their cultivation in Slovenia had already ceased. In 1996, a new variety called Hallertauer Magnum was introduced, which was already cultivated on 78 ha by 2000.

Below you can find the data on the last 12 years of hop cultivation in Slovenia (Table 5).

Even the number of hop growers has changed substantially through the years, as is evident from the table 6.



Prostranost savinjskih (slovenskih) hmeljišč (foto: D. Vrhovnik)

Vastness of Savinja Valley (Slovenian) hop fields (photo: D. Vrhovnik)

Only active hop growers have been indicated. In 2012, along with the 117 hop growers, there are 21 individuals who have recorded resting fields within the Register of Agricultural Holdings, but no hop fields. In 1992, an average hop farm measured approx 5,2 ha. In 2011, a single hop farm was responsible for an average of 10,7 ha of hop fields. From this it is evident that the area of hop fields per single farm has doubled in the past 20 years.

Preglednica 5: Primerjava hmeljskih površin v obdelavi in v premeni v Sloveniji za obdobje od leta 2001 do leta 2012 (v hektarjih)

Table 5: Comparison of the area of hop cultivation fields and resting fields in the Republic of Slovenia between 2001 and 2012 (in hectares)

	LETO / YEAR									
SORTA VARIETY	2001	2003	2005	2006	2007	2008	2009	2010	2011	2012
Aurora	1162	1002	911	912	992	1008	960	906	813	651
Savinjski golding	235	240	190	192	190	189	160	171	171	136
Bobek	181	150	136	143	158	171	154	136	116	84
Celeia	82	95	107	109	123	140	150	181	179	230
Cerera	24	24	25	25	25	22	15	9	9	2
Dana				2	4	8	12	13	13	12
Blisk	7	4	4	4						
Atlas	1	1	1	1	1	1	1	1	1	1
Cicero	3	2	1	1	1	1	1	1	1	
Sorte v preskušanju Tested varieties	15	10	9	11	13	8	9	9	13	13
Hallert. Magnum	96	90	74	66	67	65	55	61	59	26
Hallert. Taurus		8	3	3	2	2				
Hallert. Merkur			2	2	2	2	2			
Styrian gold										4
Skupaj nasadov (H) Total plantations (H)	1807	1626	1463	1471	1578	1617	1519	1488	1375	1159
Premene (P) Fields in resting (P)	251	434	416	316	302	254	207	374	453	638
H + P	2087	2060	1879	1787	1880	1871	1726	1862	1828	1797

Preglednica 6: Število hmeljarjev v Republiki Sloveniji po posameznih letih v obdobju od leta 1992 do leta 2012

Table 6: Number of hop growers in Slovenia by year between 1992 and 2012.

	LETO / YEAR										
	1992	1994	1996	1998	2000	2002	2004	2006	2008	2010	2012
Število hmeljarjev Number of hop growers	495	460	409	349	231	192	169	158	140	134	117

1992 povprečna hmeljarska kmetija velika 5,2 ha, leta 2011 pa je imela ena hmeljarska kmetija v obdelavi povprečno 10,7 ha nasadov hmelja. Iz navedenega vidimo, da se je površina nasadov hmelja na eno kmetijo v zadnjih dvajsetih letih podvojila.

Vsaka panoga v kmetijstvu se različno odziva na dejavnike, ki vplivajo na njeno spreminjanje skozi čas. Hmeljarstvo kot pridelovalna panoga se je v Sloveniji skozi desetletja aktivno odzivala na dejavnike, ki so vplivali na pridelavo hmelja. Tako so na pridelavo hmelja v smislu površinske zastopanosti hmeljnih nasadov ter sortne in starostne sestave v veliki meri vplivali razvoj, ponudba in povpraševanje. Med drugimi dejavniki, ki so vplivali na pridelavo, so tržne razmere na svetovnem trgu in sodelovanje države z raznimi ukrepi, ki so spodbujali razvoj pridelave in aktiven prenos pridelave hmelja na mlajše generacije.

Each agricultural branch responds differently to the factors which affect its development. As an agricultural activity, hop growing in Slovenia has actively responded to factors which have affected hop cultivation. The amount of hop fields, used varieties, and population were therefore largely influenced by development, and by supply and demand. Other factors which have influenced hop cultivation include global market conditions, government interventions, aimed at improving cultivation, and the active transfer of the hop production to the younger generation.





35 LET VRTA ZDRAVILNIH IN AROMATIČNIH RASTLIN NA INŠTITUTU ZA HMELJARSTVO IN PIVOVARSTVO SLOVENIJE

*Mag. Nataša Ferant
Inštitut za hmeljarstvo in pivovarstvo Slovenije*

Začetki snovanja Vrta zdravilnih in aromatičnih rastlin segajo v leto 1976, ko so trije možje, prof. Franc Sušnik – botanik, prof. Pavle Bohinc – farmacevt in prof. Tone Wagner – agronom, hoteli uresničiti takrat morda drzne ideje o osrednji instituciji za raziskovanje, pridelovanje, predelavo in uporabo zdravilnih in aromatičnih rastlin (zelišč). Osnovan je bil vrt, ki še danes predstavlja osnovo raziskovanj na področju gojenja zdravilnih in aromatičnih rastlin. V začetku je bilo posajenih vanj 40 različnih tradicionalnih vrst zelišč. Z leti se je večalo število vrst zelišč z izmenjavo semena in sadik s sorodnimi institucijami in botaničnimi vrtovi do današnjega obsega, ki šteje okoli 300 različnih vrst zelišč.

Vrt že od vsega začetka deluje večnamensko:

- znanstvenoraziskovalni namen: raziskovanje zelišč na različnih področjih (bioloških, agronomskih, kemijskih, farmacevtskih);
- svetovalni namen: svetujemo o pridelavi in predelavi zelišč (tehnologija pridelave, o izboru rastlin) ljubiteljem in profesionalnim pridelovalcem, oskrbujemo jih z ekosemenom in ekosadikami;
- vzgojno-izobraževalni namen: vodene ekskurzije po vrtu za vse generacije, material in mentorstvo za raziskovalne, diplomske, magistrske in doktorske naloge.

Vrt s pestro izbiro rastlinskih vrst nam daje odgovore na vprašanja, kako določena vrsta uspeva v našem okolju, kako pri tem reagirajo različni tipi ali sorte iste vrste, kakšne pridelke dajejo in kakšne kvalitete je ta pridelek. Proučevanje rastlin obsega od opazovanja rasti in razvoja, občutljivosti na bolezni in škodljivce, količine in kakovosti pridelka do ugotavljanja ekonomičnosti pridelave. Mogoča je odbira najboljših tipov za nadaljnje razmnoževanje.

Leta 1996 je Vrt zdravilnih in aromatičnih rastlin pridobil status nacionalne zbirke v okviru nacionalnega programa Slovenska rastlinska genska banka, prav tako je priznan tudi mednarodno. Že od vsega začetka sodelujemo s številnimi sorodnimi raziskovalnimi institucijami in

35TH ANNIVERSARY OF THE HERBS AND AROMATIC PLANTS GARDEN AT THE INSTITUTE OF HOP RESEARCH AND BREWING

*Nataša Ferant, MSc
Slovenian Institute of Hop Research and Brewing*

The beginning of the Medicinal and Aromatic Plants Garden date back to 1976, when three men, Prof. Franc Sušnik, botanist, Prof. Pavle Bohinc, pharmacist, and Prof. Tone Wagner, agronomist, set out to realize the then bold idea on a central institution involved in the research, cultivation, processing, and application of medicinal and aromatic plants (herbs). It was based on a garden which even today represents the basis for research of cultivation of medicinal and aromatic plants. At first, 40 traditional species of herbs were planted in the garden. Through the years, the number of herbs has increased through the exchange of seeds and seedlings with related institutions and botanical gardens, and until today, the number of different herbs has increased to approx. 300.

Since the beginning, the garden was aimed at:

- scientific research: it includes the examination of herbs from different aspects, i.e. biological, agronomic, chemical, pharmaceutical etc.
- advisory activities: we offer advice on the cultivation and growing of herbs (on the cultivation technology, on the selection of varieties) to amateurs and professionals, which we supply with Eco-seeds and seedlings, and
- educational activities: guided tours of the garden for every generation, material and mentorship in research activities, graduate and post-graduate papers, as well as dissertations.

The garden and its varied assortment of plant varieties provides answers to many questions; how can a certain species thrive in our environment, how does that influence different types or variations of the same variety, what is their yield, and their quality. The examination of plants includes everything from the observation of growth to their development, sensitivity to disease and pests, harvest yield and quality, and cost-effective cultivation. This enables the selection of the best specimens for further reproduction.

In 1996, the garden was granted the status of a national

botaničnimi vrtovi po svetu, od koder dobivamo semena in informacije o rastlinah. Izmenjava semen poteka preko seznama semen (Index Seminum).

V okviru dejavnosti vrta je nastala cela vrsta objav in člankov. Sodelavci so v tem času predstavili svoje delo na kongresih in objavili številne strokovne in poljudne članke v domači in tuji literaturi. Z vrtom so povezane tri knjige: Pridelovanje zdravilnih rastlin (1980) in Pridelovanje zelišč (1997) dr. Toneta Wagnerja ter Zeliščni vrt – domača lekarna (2001) dr. Janka Rodeta.

Vrt je danes postavljen na 30 arih. Razdeljen je na dva dela.

- Ogledni del vrta je posajen z zelišči, ki so značilna za naše področje. To je kolekcija slovenskih tradicionalnih rastlin. Ena od gred je namenjena zbirki strupenih rastlin, ki imajo zdravilni učinek. Njihova uporaba mora biti strogo nadzorovana. Dve gredi namenjamo dišavnicam, ki jedem izboljšajo okus in vonj in tudi pospešujejo prebavo.
- Poskusni del vrta je posajen z rastlinami, ki smo jih pridobili z izmenjavo s sorodnimi inštituti in botaničnimi vrtovi, rastlinami, ki smo jih uporabili v raziskavah in poskusih ter bogatijo našo zbirko, in kolekcijo, ki je del slovenske rastlinske genske banke. Na delu te površine pridelujemo sestavine za naše čaje.

Posajenih je tudi nekaj dreves in grmov, ki imajo zdravilni učinek: lipa, šipek, aronija in črni ribez.

Zelo pomembna dejavnost je vzgoja sadik oziroma sadilnega materiala. Sadike zdravilnih in aromatičnih rastlin na IHPS vzgajamo v skladu z ekološkimi

collection within the scope of the “Slovenian Plant Gene Bank” programme.

The Medicinal and Aromatic Plants Garden has also been recognized internationally. Since the very beginning, we have been cooperating with numerous related research institutions and botanical gardens from around the World, who supply our seeds and provide us with information on plants. Exchange is conducted through the Index Seminum, an index of seeds.

Within the activities associated with the garden, a series of publications and articles has been made. In this period, the contributors have presented their work at congresses, and have published numerous scientific as well as non-technical articles in domestic and foreign literature. The garden is associated with three books, two of which are by Dr. Tone Wagner: Cultivation of Medicinal Plants (1980) and Cultivation of Herbs (1997), and one by Dr. Janko Rode: Herbal Garden – Home Pharmacy (2001).

Today, the garden extends over three quarters of an acre. It is divided into:

- A visitor's area containing herbs which are characteristic for this area. It is a collection of traditional Slovenian herbs. One of the beds is intended for the collection of toxic plants with a therapeutic effect. Their use must be strictly monitored. Two beds are reserved for aromatic plants, which not only improve the flavour of prepared food but also improve digestion.
- An experimental portion of the garden contains plants acquired through exchange with related institutes and botanical gardens, as well as plants previously used in research and experiments, enhancing our collection, which constitutes part of the Slovenian plant gene bank; here, an area intended for the cultivation of ingredients for our teas can also be found.



Vsako leto obiše Vrt zdravilnih in aromatičnih rastlin veliko obiskovalcev (foto: V. Ferant)

Annually, the Herbs and Aromatic Plants Garden is visited by large numbers of visitors (photo: V. Ferant)

The garden also includes certain trees and bushes with healing properties, such as the lime tree, rose-hip, aronia, and black currant.

Another important garden activity is the cultivation of seedlings. At the Institute, seedlings of medicinal and aromatic plants are cultivated in accordance with ECO guidelines for the cultivation of Eco-friendly plants under the supervision of the Institute of Inspection and Certification in Agriculture and

smernicami za vzgojo ekosadik pod kontrolo Inštituta za kontrolo in certifikacijo v kmetijstvu in gozdarstvu iz Maribora. V letu 2005 smo prvič pridobili certifikat za vzgojo ekoloških sadik zelišč. Sadike vzgajamo iz semena, ki ga pridelamo v našem vrtu, in s potaknjenci iz naših matičnih rastlin.



Zdravilne rastline lahko posadimo tudi v skalnjak (foto: V. Ferant)
Herbs can also be planted in rock gardens (photo: V. Ferant)

ZAKLJUČEK

Poslanstvo Vrta zdravilnih in aromatičnih rastlin je bilo v teh 35 letih izpolnjeno. Vrstili so se vzponi in padci, skorajšnje uničenje in nadaljevanje začetega dela. Izpolnjujemo osnovno poslanstvo na področju zdravilnih rastlin: raziskovanje, svetovanje in izobraževanje. Vrt kljubuje času ter včasih zanj nenaklonjenim razmeram na inštitutu in v državi. Je kot grdi raček, ki se razvija v čudovitega belega laboda. Napočil je čas, da zacveti v polnem cvetu!

in Silviculture in Maribor. In 2005, we have obtained the certificate required for the cultivation of Eco herb seedlings for the first time. Seedlings are grown from seeds or cultivated through plant cuttings from our parent plants.

CONCLUSION

The mission of the Medicinal and Aromatic Plants

Garden has been updated in its 35 years of operation. We have faced ups and downs, and were even met by near destruction, and the continuation of work. We are fulfilling our primary mission in the field of medicinal plants, which involves research, advisory services, and education. The garden has withstood the test of time, even despite the sometimes unfavourable conditions at the Institute and within the country itself. It is an ugly duckling which will develop into a beautiful swan. And the time for the garden to fully bloom has finally come.



HMELJARSTVO V SVETU IN PRI NAS

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V 21. stoletju je gospodarska pridelava hmelja razširjena po vseh celinah med petintridesetim in petinpetdesetim vzporednikom, severno in južno od ekvatorja. V pridelavi hmelja, eni od štirih osnovnih sestavin piva, že vrsto let krepko prednjačijo nemški in ameriški hmeljarji. Iz Nemčije in ZDA pridobijo pivovarne približno dve tretjini svetovnega pridelka hmelja v obliki različnih produktov. Tretje mesto zaseda Češka. Pomembnejše izvozno usmerjene države pridelovalke so še Kitajska, Poljska, Slovenija, Velika Britanija, Ukrajina,



HOP INDUSTRY WORLDWIDE AND IN SLOVENIA

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In the 21st century, commercial hop production has spread to every continent between the 35th and 55th parallel north as well as south of the equator. The hop industry sector has been fronted for a number of years by German and American hop growers, concerned with producing one of the four key beer ingredients. From Germany and the USA, breweries are able to obtain approx. two thirds of the global hop harvest in the form of different products. The third place is occupied by the Czech Republic. The more important export-oriented countries also include China, Poland, Slovenia, Great Britain, Ukraine, France, Spain, and in the southern hemisphere, Australia, New Zealand, and the Republic of South Africa. Other countries mainly produce hops for their own needs.

Francija, Španija ter na južni polobli Avstralija, Nova Zelandija in Južnoafriška republika. V preostalih državah pridelujejo hmelj pretežno za lastne potrebe.

Gospodarske razmere v hmeljarstvu pogojujejo proizvodna in tržna dogajanja ter raziskave v svetovni pivovski industriji (1,9 mrd hl piva letno). Povpraševanje pivovarn po donosnejših sortah hmelja, možnosti sodobnih oblik predelave in skladiščenja proizvodov hmelja ter poslovne poteze mednarodno organiziranih trgovcev s hmeljem vplivajo tudi na gospodarnost pridelave hmelja. V hmeljarstvu – podobno kot tudi v pivovarstvu in trgovini s hmeljem – že desetletja opazujemo izrazito koncentracijo kapitala in odločanja.

Površine hmeljišč v svetu obsegajo okoli 50000 ha različnih grenčičnih in aromatičnih sort hmelja, pridelek hmelja pa dosega približno 100000 ton hmelja in približno 10000 ton grenčic (alfa-kislin). Iz različnih statistik že vrsto let beležimo v svetu zmanjševanje površin hmeljišč. K temu največ pripomorejo vedno sodobnejši načini predelave hmelja za potrebe pivovarstva in pa po pridelku vedno donosnejše nemške in ameriške visokogrenčične sorte hmelja.

Zaradi uspešnejšega gospodarjenja so evropski hmeljarji iskali medsebojne povezave že v času Avstro-Ogrske. Korenine sodobne organiziranosti pa segajo v leto 1951, ko so predstavniki hmeljarjev pomembnejših držav zasnovali Mednarodno hmeljarsko organizacijo (IHGC). Ta predstavlja v svetovnem merilu najširšo stanovsko povezanost na področju hmeljarstva in povezuje tako hmeljarje kot trgovce s hmeljem ter različne strokovnjake in ljubitelje s področja hmeljarstva in pivovarstva.

Hmeljarstvo v Sloveniji ima tradicionalno pomembno vlogo v mednarodnem prostoru, saj predstavlja po obsegu že desetletja okoli 3 % svetovnih površin hmeljišč. Zgodovina hmeljarstva v Sloveniji je slikovito predstavljena v knjigi Pol stoletja hrama zelene učenosti, ki jo je leta 2002 izdal Inštitut za hmeljarstvo in pivovarstvo Slovenije ob svoji 50-letnici delovanja. Tudi desetletje po omenjeni obletnici nosi podoba hmeljarstva v Sloveniji še vedno močan pečat bogate tradicije pridelave lastnih sort aromatičnega hmelja. Najbolj razširjene sorte hmelja z navedenimi imeni, sinonimi in kraticami so: Aurora (Super Styrian Aurora, SS), Bobek (Styrian golding B, SGB), Celeia (Styrian golding, SG) in Savinjski golding (Styrian Savinjski golding, SSG). Hmeljarji so tesno povezani s strokovnim svetovanjem in raziskovalnim delom inštituta.

Hmeljarstvo je v Sloveniji izvozno najizrazitejša panoga kmetijstva. Pridelek hmelja v Sloveniji je pretežno (90 %) namenjen izvozu na različne evropske in prekomorske

The economic situation within the hop sector is controlled by the production, market and research activities of the global brewing industry (1.9 billion hectolitres of beer annually). The demand of breweries for more profitable hop varieties, modern processing methods, and storage of hops, as well as the business decisions of the internationally organized hop merchants affect the economy of the hop industry. In the hop industry – similarly to the brewing sector and hop trade – we have been noticing the concentration of capital and of the decision-making process for decades.

Hop growing areas around the world are composed of approx. 50,000 ha of bitter (super-alpha) and aroma hop varieties, and the total hop yield amounts to approx 100,000 metric tons of hops, and approx. 10,000 metric tons of alpha-acids. Different statistics have shown that we have been witnessing a decline in hop growing acreage for a number of years. This is accelerated mostly by modern hop processing methods and increasingly profitable German and American highly bitter i.e. super-alpha hop varieties.

Due to more successful management, European hop growers have been trying to interact with each other since the times of the Austro-Hungarian Empire. The beginnings of the modern organization date back to 1951, when representatives of hop growers from more important countries formed the International Hop Growers' Convention (IHGC). Globally, this is the largest association in the field of hop growing, which has been bringing hop growers and retailers closer together, as well as different specialists and amateurs involved in hop growing and brewing.

Traditionally **hop growing in Slovenia** has always been important. Globally, Slovenian acreage has for decades constituted approx. 3% of all global hop cultivating areas. The history of hop growing in Slovenia is well presented in the book *Half a Century of Green Knowledge*, published by the Institute for Hop Research and Brewing in 2002 during its 50th anniversary. Even a decade after that anniversary, hop growing in Slovenia still bears a strong sense of traditional cultivation of proper aromatic hop varieties. The most common hop varieties – including their names, synonyms, and abbreviations – are: Aurora (Super Styrian Aurora, SS), Bobek (Styrian Golding B, SGB), Celeia (Styrian Golding, SG) and Savinjski golding (Styrian Savinjski Golding, SSG). Hop growers cooperate closely with the advisory and research staff of the institute.

Hop growing is the most typical agricultural branch in Slovenia in the sense of export. The hop harvest in Slovenia is primarily intended for export to different

trge. Večina pridelave hmelja je skoncentrirana na območju Savinjske doline, medtem ko so ostala hmeljišča še v okolici Celja, Slovenj Gradca, Radelj ob Dravi, Ptuja in Ormoža. V letu 2012 beležimo pridelavo hmelja skupaj s površinami premene na okoli 1400 ha, 140 hmeljarskih posestev pa prideluje pretežno aromatične sorte – plod dolgoletnega in uspešnega programa žlahtnjenja hmelja na Inštitutu za hmeljarstvo in pivovarstvo Slovenije v Žalcu.



European and overseas markets (90%). It is mostly cultivated in the area of the Savinja Valley, while the rest of the hop growing fields are located near Celje, Slovenj Gradec, Radlje ob Dravi, Ptuj, and Ormož. In 2012, we recorded that hops are being produced on, along with the resting fields, approx 1,400 ha, while 140 hop farms are involved especially with aromatic varieties, which are the result of the many years of successful activity of the hop breeding programme at the Institute for Hop Research and Brewing in Žalec.

Generalni sekretariat Mednarodne hmeljarske organizacije (www.ihgc.org) je že od leta 1967 v Sloveniji

The General Secretariat of the International Hop Growers' Convention (www.ihgc.org) has been located in Slovenia since 1967

SLOVENSKE SORTE HMELJA – VČERAJ, DANES, JUTRI

*Dr. Andreja Čerenak
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Vzgoja novih sort rastlin je postopek, s katerim človek z izbiro izboljšuje posamezne ali večje število lastnosti kmetijskih rastlin. Že prvi poljedelci so odbirali najprimernejše rastline za nadaljnjo setev oz. sajenje, na znanstveni podlagi pa temelji žlahtnjenje rastlin od začetka 20. stoletja. Kot pri drugih kmetijskih rastlinah se tudi pri hmelju daje največji poudarek povečanju pridelka ter izboljšanju kvalitete in odpornosti na najpomembnejše bolezni in škodljivce. Hmelj je rastlina, ki je občutljiva na mikroklimatske spremembe, zlasti na spremenjeno dolžino dneva. Z uvajanjem določene sorte hmelja iz območja, kjer je bila požlahtnjena, v drugo območje se lahko spremeni razrast rastlin, količina in kvaliteta pridelka, spremeni pa se tudi stopnja odpornosti proti posameznim boleznim in škodljivcem. Posledica vsega navedenega je, da ima vsaka dežela, ki se ukvarja s pridelovanjem hmelja v malo večjem obsegu, razvit svoj žlahtniteljski program. To so spoznali tudi slovenski hmeljarji, saj uvajanje tujih sort (angleških, čeških, nemških, ameriških itn.) od konca 19. stoletja pa vse do danes ni dajalo zelenih rezultatov na našem pridelovalnem območju. Zaradi teh pridobljenih

SLOVENIAN HOP VARIETIES – THE PAST, THE PRESENT, THE FUTURE

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The cultivation of new varieties is a process aimed at improving individual or even several characteristics of crops. Even the first farmers selected plants which were the most suitable for cultivation or planting, while breeding as a science was not introduced until the beginning of the 20th century. Similarly to other crops, the largest emphasis in hop breeding is put on increasing yield, enhancing quality, and improving resistance to the most common diseases and pests. Hop is a plant which is sensitive to microclimatic changes, especially to day length. Introducing a hop variety from a specific breeding area into a different area can affect the plant growth, as well as the quantity and quality of the yield, and can also influence the degree of resistance to individual diseases and pests. That is why every country which produces larger quantities of hops has developed its own breeding programme. Slovenian hop farmers have come to the same conclusions, as the introduction of foreign varieties (English, Czech, German, American etc.) into their producing area from the beginning of the 19th century until today has not yielded the desired

izkušenj so hmeljarji na samem začetku obstoja inštituta podprli razvoj lastnega žlahtniteljskega programa.

Edina sorta, ki se je obdržala od samega začetka uvajanja hmelja na Slovenskem pa vse do danes, je **Savinjski golding**, ki je prilagojena različica angleške sorte Fuggle. Še po več kot 100 letih pridelovanja uspeva na precejšnjem deležu hmeljišč, najpomembneje pa je to, da je zaradi svoje prepoznavne fine hmeljske arome razširila sloves slovenskega hmelja širom po svetu.

V šestdesetih letih prejšnjega stoletja so na IHPS ustanovili in nadaljevali s širjenjem genske banke hmelja, to je zbirke sort hmelja z različnih območij pridelave, ki danes šteje nad 150 tujih sort hmelja. Rezultat prvih križanj tujih sort in slovenskih moških hmeljnih rastlin so bile sorte Aurora, Atlas, Ahil in Apolon, ki so bile priznane leta 1970. Največji uspeh je bil dosežen s sorto **Aurora**, ki se še danes prideluje na več kot 60 % slovenskih hmeljišč in je naša vodilna sorta, ponos slovenskega hmeljarstva. Aurora je sorta, ki zaradi svoje dobre prilagojenosti in odpornosti na bolezni hmeljarjem daje visokokakovosten in stabilen pridelek z žlahtno hmeljsko aromo. Njena grenčica je zaradi značilne sestave grenčičnih smol zelo nežna in prijetna ter zato zelo zaželeno v pivovarnah po svetu.

Sledila so osemdeseta leta prejšnjega stoletja, ko so bile vpisane tri nove sorte hmelja – Blisk, Buket in Bobek. Cilj žlahtniteljske serije je bilo žlahtnjenje na boljšo aromo in večjo odpornost na bolezni in škodljivce. Za hmeljarje in trgovino s hmeljem je bila in je še najbolj zanimiva sorta **Bobek**, zaradi povečanega pridelka in lastnosti, v določeni meri podobnih sorti Aurora.

V devetdesetih letih so bile priznane nove štiri slovenske sorte hmelja – Celeia, Cerera, Cekin in Cicero, žlahtnjene na kakovost Savinjskega goldinga in velik pridelek. Najbolje sprejeta pri vseh sodelujočih v hmeljarski panogi, hmeljarjih, trgovcih s hmeljem in pivovarjih, je **Celeia**, ki v zadnjih letih zavzema primerljiv delež površin kot sorti Savinjski golding in Bobek. Znana po harmonični hmeljski aromi daje pivcu piva zaokrožen hmeljski okus.

Po uspešnem delu na raziskovalnem področju in nato



Sorta Aurora v nasadu (foto: A. Čerenak)

The hop field of variety Aurora (photo: A. Čerenak)

results. Based on the experience, hop farmers have been supporting the development of own breeding programme since the founding of the Institute.

The only variety which has been preserved from the period of the first introductions of varieties in Slovenia is the **Savinjski golding**, which is an ecotype of the English variety Fuggle. Even after more than 100 years of production, it is still grown on a substantial percentage of fields. But it is even more important that its characteristic aroma has promoted Slovenian hops worldwide.

In the 1960s, the Institute founded and has since continued to expand their hop gene bank, which consists of hop varieties from different producing areas,

and includes over 150 foreign hop varieties. The first crossings of foreign varieties with Slovenian male plants resulted in the varieties Aurora, Atlas, Ahil, and Apolon, which were officially approved in 1970. The variety **Aurora** is considered the most successful, as it is still being cultivated in over 60% of hop fields, and is our leading variety, the pride of hop production in Slovenia. Aurora is a variety that provides farmers with a quality and stable yield with an exquisite hop aroma, and is well adapted and is resistant to most diseases. Due to the structure of the resins, its bitterness is smooth and pleasant, and is therefore widely used by brewers around the world.

In the 1980s, three new hop varieties were registered – Blisk, Buket, and Bobek. This breeding strategy was aimed at improving the aroma and increasing the resistance to diseases and pests. Hop farmers and merchants were and still are the most interested in the variety **Bobek** due to the increased yield and its characteristics, similar to those of the variety Aurora.

In the 1990s, four new Slovenian hop varieties were released – Celeia, Cerera, Cekin, and Cicero, which are bred for their Savinjski golding-like quality and high yield. The variety **Celeia** has been best accepted by stakeholders of the hop industry, the farmers, hop merchants, and brewers. In recent years, it has been as widely grown as the varieties Savinjski golding and Bobek. It is known for its harmonic aroma, and gives beer

kadrovski menjavi generacij se je vzgoja sort hmelja nadaljevala z enakim trendom, saj je bila pred petimi leti vpisana prva slovenska visokogrenična sorta **Dana**, kjer prijetno grenčico dopolnjuje fina hmeljska aroma, zelo sorodna aromi Aurore. Dana se tako lahko plasira na trg tudi kot sorta z dvojno uporabno vrednostjo, torej kot grenčična in aromatična sorta hkrati (ang. dual purpose), in je po svojih grenčičnih lastnostih primerljiva z najbolj uveljavljenimi tujimi sortami.



Storžki sorte Dana (foto: F. Korber)

The cones of variety Dana (photo: F. Korber)

i.e. a bittering and aromatic variety, since its bittering characteristics can be compared to the most renowned foreign varieties.

V letošnjem letu pa je IHPS vpisal še eno novo sorto hmelja, žlahtnjeno na aromo Savinjskega goldinga, povečan pridelek in bistveno višjo odpornostjo na gospodarsko najpomembnejšo bolezen pri hmelju, hmeljevo peronosporo. **Styrian gold** je prva sorta z močnejše izraženo odpornostjo na verticilijsko uvelost hmelja, na kar smo zelo ponosni. Zaradi njenih izrednih lastnosti smo jo poimenovali Styrian gold, torej Štajersko zlato. Pivovarska vrednost nove sorte, preizkušena v laboratorijih tako na IHPS, v slovenskih pivovarnah kot tudi v referenčnih mikropivovarnah v tujini, je praktično nerazločljiva od ene izmed najbolj zaželenih finih hmeljnih arom v svetu, od arome Savinjskega goldinga.



Rastlina sorte Styrian gold tik pred obiranjem (foto: S. Vodušek)

The plant of variety Styrian gold before the harvest (photo: S. Vodušek)

Raziskovalno delo na področju vzgoje novih sort hmelja je v dolgoletni povezavi z Biotehniško fakulteto v Ljubljani, kjer s povezovanjem znanj in razpoložljive raziskovalne opreme uspešno sodelujemo pri razvoju molekularskih markerjev, povezanih z agronomsko najpomembnejšimi lastnostmi, kot so določitev spola, vsebnost alfa kislin, odpornost na verticilijsko uvelost hmelja in količina pridelka. Vpeljava različnih biotehnoloških postopkov v žlahtnjenju hmelja

a well-rounded hop flavour.

The successful research activities saw the generation renewal, and hop breeding continued following the same trends. Five years ago, the first Slovenian bitter hop variety **Dana** was developed; its bitterness is perfectly supplemented by the exquisite aroma, similar to that of the variety Aurora. The variety Dana can therefore be marketed as a dual purpose variety,

This year, the Institute has registered another new hop variety. It was bred for its aroma of Savinjski golding, increased yield and substantially improved resistance to the most economically-important hop disease, Hop Downy Mildew. We are very proud that **Styrian Gold** is the first variety with integrated improved resistance to Verticillium wilt resistance. Due to its outstanding characteristics, the variety has been named Styrian Gold. The brewing value of the new variety, which has been tested in the laboratories of the Institute and by Slovenian breweries, as well as reference microbreweries abroad, cannot easily be distinguished from one of the finest hop aromas in the world, the Savinjski golding.

For several years, research activities aimed at the development of new hop varieties have been conducted in

cooperation with the Biotechnical Faculty in Ljubljana. By sharing knowledge and the available research equipment, we have been successfully collaborating in the development of molecular markers associated with the characteristics which are the most important in the agricultural sense, such as determination of

nam bo tudi v prihodnje skrajšala dolgotrajni postopek vzgoje novih sort.

In naši cilji v prihodnje? Ves čas sledimo smernicam, povezanim s spremenjeno pivovarsko tehnologijo, pridelavo hmelja in tudi interesom trgovine s hmeljem. Poleg že omenjenih sort hmelja imamo v preizkušanju že nove perspektivne križance, ki v enem segmentu izboljšujejo lastnosti že uveljavljenih sort, kot so zvišanje vsebnosti alfa kislin, povečane odpornosti na bolezni in zvišanje pridelka. Na drugi strani pa imamo izbrane bodoče nove sorte hmelja, ki izražajo specifično, drugačno aromo z večjim poudarkom na sadnih in cvetličnih notah in manj na tipični hmeljski aromi. Glede na lastnosti križancev v preizkušanju lahko zatrdimo, da so na pragu nove pridelovalno in tržno zanimive sorte hmelja, namenjene slovenskim hmeljarjem in pivovarjem po vsem svetu.



Križanec hmelja (foto: A. Čerenak)

The hop breeding line (photo: A. Čerenak)

sex, alpha acid content, Verticillium wilt resistance, and quantity of the yield. Introduction of different biotechnological methods in hop breeding will continue to reduce the time required for development of a new hop variety.

And our goals for the future? We always consider our goals connected to the modernization of brewing technology, hop production, as well as the interest of the hop trade. Along with the varieties mentioned above, we have already started testing promising hybrids similar to the established varieties, but with improved characteristics – higher alpha acid content, improved resistance to diseases, higher yield. On the other hand, we have already selected new hop varieties with a specific, distinct aroma, which have a stronger sense of fruit and flower

flavours, and have a less typical hoppy aroma. In the light of the characteristics of hybrids currently in testing, it is certain that new hop varieties, interesting both in the production and marketing sense, will be released available to Slovenian hop farmers and brewers around the world.



CERTIFICIRAN SADILNI MATERIAL HMELJA

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Zasadilni material hmelja imamo v Sloveniji vzpostavljeno certifikacijsko shemo, ki temelji na priporočilih oziroma standardih Evropske organizacije za varstvo rastlin (European and Mediterranean Plant Protection Organization – EPPO, št. PM 4/16 (2)). Certifikacijska shema opisuje vzgojo vegetativno razmnoženih rastlin za sajenje ali nadaljnje razmnoževanje, pridobljenih iz izvirnega materiala pod pogoji, ki zagotavljajo, da so izpolnjeni vsi zdravstveni standardi. Certifikacijska shema hmelja je bila v Sloveniji vzpostavljena v letu 2003. Eden izmed glavnih in odločujočih razlogov za njeno vzpostavitev je bil pojav karantenske bolezni hmelja – verticilijska uvelost hmelja, ki jo povzročata glivi *Verticillium albo-atrum* in *Verticillium dahliae*.

CERTIFIED HOP PLANTING MATERIAL

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In Slovenia, a certification model for hop planting material has been instituted, which is based on the recommendations and standards of the European and Mediterranean Plant Protection Organization (EPPO) No. PM 4/16 (2). The certification model describes the cultivation of plants propagated vegetatively intended for planting or further propagation, which were acquired from the source material and ensure the fulfilment of each and every health standard. The certification model in Slovenia was implemented in 2003. One of the main and deciding factors for its implementation was the appearance of a quarantine hop disease, the Verticillium, caused by the fungi *Verticillium albo-atrum* and *Verticillium dahliae*.

Od leta 1986 dalje na Inštitutu za hmeljarstvo in pivovarstvo Slovenije poteka vzgoja brezvirusnih sadik hmelja. V letu 2009 smo z namenom zagotovitve še kakovostnejšega sadilnega materiala hmelja pričeli z razmnoževanjem brezviroidnih sadik hmelja, kar pomeni, da so sadike hmelja sedaj brez prisotnosti sedmih virusov in hmeljevega latentnega viroida (Hop latent viroid-HLVd). Vsi naštetih škodljivi organizmi dokazano zmanjšujejo količino in kakovost pridelka hmelja.

V skladu s Pravilnikom o trženju razmnoževalnega materiala in sadik hmelja (Uradni list RS, št. 21/2007, 19/2008 in 12/2010) ter sprejeto certifikacijsko shemo hmelja imamo v Sloveniji tri kategorije sadilnega materiala hmelja, in sicer certificirane sadike A, certificirane sadike B in standardne sadike. S certificiranim in standardnim sadilnim materialom hmelja ter z upoštevanjem osnovnih fitosanitarnih higienskih ukrepov hmeljarji dosegajo visok in kakovosten pridelek hmelja. Prav tako z omenjenim materialom uspešno preprečujemo širjenje karantenskih bolezni, kot sta verticilijska uvelost hmelja in viroidna zakrnelost hmelja (Hop stunt viroid-HSVd).



Osnovne matične rastline hmelja (OMR) v mrežniku (foto: M. Oset Luskar)

Basic hop parent plants under a trellis (photo: M. Oset Luskar)

Since 1986, the Institute of Hop Research and Brewing has been raising virus-free hop seedlings. In 2009, we have started growing viroid-free hop seedlings with the purpose of providing even more quality planting material. This means that from now on, our hop seedlings are guaranteed to be free of seven viruses and a Hop Latent Viroid – HLVd. All of the mentioned organisms decrease the yield quantity and quality.

In Slovenia, in accordance with the Rules on the marketing of hop propagating material and of hop plants (Official Journal of the RS, No. 21/2007, No. 19/2008, and No. 12/2010) and the adopted certification model, three different hop planting material categories exist: certified seedlings A, certified seedlings B, and standard seedlings. By using certified and standard hop planting material and by considering basic phytosanitary and hygienic measures, hop growers are able to cultivate hops of higher quality and yield. The mentioned material is also successful in preventing the spread of quarantine diseases, such as hop wilt and Hop Stunt Viroid – HSVd.



HMELJEVA PERONOSPORA – BOLEZEN, KI JE SPREMENILA HMELJARSTVO

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Hmeljeva peronospora je najpomembnejša bolezen hmelja, ki jo povzroča plesnivka *Pseudoperonospora humuli* (Miyabe & Takah. G. W. Wils). Povzročala lokalizirane infekcije listja, cvetov in storžkov ter sistemske infekcije, katerih rezultat so prizadeti poganjki (kuštravci) in

HOP DOWNY MILDEW – THE DISEASE THAT HAS CHANGED HOP GROWING

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Hop Downy Mildew is one of the most common hop diseases, and is caused by *Pseudoperonospora humuli* (Miyabe & Takah. G.W.Wils). It is the cause of local leaf, flower, and cone infections and systemic infections which result in stunned young vines and a deterioration

propadanje koreninskega sistema. Prvi pojav te bolezni so potrdili leta 1905 na Japonskem, leta 1909 v ZDA, leta 1920 je bila odkrita tudi v Angliji in Italiji. Po Evropi se je nato naglo razširila. Leta 1923 so jo ugotovili v Nemčiji, leta 1924 v Franciji, leto kasneje v Belgiji. V Savinjski dolini je bila potrjena v letu 1925. V obdobju 1920–1930 je v Evropi povzročila hudo gospodarsko škodo in vplivala na opuščanje pridelave občutljivih kultivarjev, kot je npr. württenberški hmelj. V tem času so se kot odporni izkazali kultivarji (Goldings) iz Anglije, ki so se uveljavili tudi v Sloveniji in kasneje s klonsko selekcijo postali sorta Savinjski golding. Pojav hmeljeve peronosporne tako v zgodovini hmeljarstva predstavlja pomemben mejnik, ki je prisilil hmeljarje v prilagoditev sortne sestave in vsakoletno redno izvajanje dodatnih varstvenih ukrepov za ohranitev pridelka. Bolezen je trenutno razširjena v večini hmeljarskih dežel in območij rastišč divjega hmelja, razen v Avstraliji, na Novi Zelandiji in v Južni Afriki, kamor se do sedaj zaradi strogih fitosanitarnih ukrepov še ni prenesla.

Hmeljeva peronospora se lahko razvije na vseh organih hmeljne rastline. Značilno sistemsko okužbo, ki omogoča prezimitev te plesnivke, lahko opazimo na prerezu hmeljne korenike in podzemnem stebelu. Obolelo tkivo je vijolično rdeče barve, ki se koncentrično širi in zajema prevodno tkivo (slika 1). Iz sistemsko okuženih korenin in brstov spomladi poženejo okuženi poganjki (*bazalni kuštravci*), ki jih prepoznamo po skrajšanih in odebeljenih medčlenkih ter rumenkastih, navzdol obrnjenih listih (slika 2). Ob ugodnih pogojih se na spodnji strani listov razvije vijolično sivkasta prevleka trosonoscev s sporami, ki predstavljajo vir nadaljnjih sekundarnih okužb v

of the root system. This disease was first identified in 1905 in Japan, then in 1909 in the USA, while it was not discovered in England and Italy until 1920. After that, it has spread quickly through Europe. In 1923, it was discovered in Germany, in 1924 in France, and a year later in Belgium. In the Savinja Valley, it was not discovered until 1925. In the period from 1920 to 1930, Downy Mildew was causing substantial economic damage in Europe, and was the reason for the abandonment of more sensitive varieties, such as the Württemberg hop variety. In that period, English varieties (Goldings) proved to be resistant. These were also established in Slovenia, and through later cloning and selection,

were transformed into the Savinjski golding variety. The appearance of Downy Mildew represented an important turning point for the hop growing industry. It was then that hop growers were forced to adjust their varieties and to introduce additional annual controls aimed at preserving the hops. The disease is currently spread through most of the hop cultivating countries and wild hop fields, excluding Australia, New Zealand, and South Africa; until now, the disease has been controlled in these locations as a result of strict phytosanitary measures.

Hop Downy Mildew can infect every organ of the hop plant. A characteristic systemic infection, which enables the mildew to survive the winter, can be noticed in the cross-section of the rhizomes and the underground stalk. The infected tissue turns a purplish-red colour, which spreads concentrically and includes the binding tissue (Figure 1). From the systemically infected roots and buds, in spring, infected sprouts will grow (basal spikes), which can



Slika 1: *Prečni prerez hmeljne korenike, okužene s sistemsko okužbo hmeljeve peronospore – prizadeto tkivo opazimo kot vijolično rdeče obarvanje prevodnega tkiva (foto: S. Radišek)*

Figure 1: *Cross-section of a hop rhizome with a systemic hop Downy Mildew infection. The infection can be seen in the purple-to-red coloured binding tissue (photo: S. Radišek)*



Slika 2: *Hmeljeva peronospora: sistemsko okuženi hmeljni poganjki (kuštravci), levo zgoraj – lateralni kuštravec, levo spodaj – terminalni kuštravec, desno – bazalni kuštravec (foto: S. Radišek)*

Figure 2: *Hop Downy Mildew: Systemic infection of hop buds (spikes). Top left – lateral spike; bottom left – terminal spike; right – basal spike (photo: S. Radišek)*

nasadu. Te na zgornji strani listov opazimo kot blede rumene pege, omejene z listnimi žilami, ki kasneje porjavijo (slika 3). Oboleli cvetovi porjavijo in otrdijo ter kasneje odpadejo. Okužba na storžkih se razvije na braktejah in brakteolah, ki prav tako porjavijo (slika 4). Če so okuženi mladi storžki, se ti deformirajo, pri starejših, že razvitih storžkih, pa porjavijo le posamezni krovni lističi.

Preprečevanje hmeljeve peronosporo danes temelji na integriranih pristopih, ki vključujejo vzgojo odpornih sort, fitosanitarne ukrepe in uporabo fungicidov na osnovi signalizacije prognostične službe. Varstvo hmelja se prične spomladi z zatiranjem primarne okužbe oziroma pojava primarnih kuštravcev, ki predstavljajo vir nadaljnjih okužb v nasadu. Poleg mehaničnega odstranjevanja okuženih brstov v času rezi in kuštravcev v času navijanja hmelja temelji zatiranje primarne okužbe na uporabi sistemskih fungicidov. Od teh sta najpogostejše uporabljena fungicida na osnovi aktivne snovi fosetil-Al in metalaksil-M, od katerih zadnji omogoča tudi zdravljenje hmeljne korenike. Uporabo sistemskih fungicidov svetujemo, če v nasadu delež rastlin s kuštravci presega 3 %. Ker se bazalni kuštravci ne pojavijo vsako leto tako zgodaj, se lahko za uporabo fungicidov odločimo tudi na osnovi pojava kuštravcev v letu



Slika 3: Listje, okuženo s hmeljevo peronosporo (foto: S. Radišek)

Figure 3: Downy Mildew-infected leaf (photo: S. Radišek)



Slika 4: Hmeljeva peronospora: levo – okuženi storžki, desno zgoraj – začetne okužbe storžkov in listja, desno spodaj – močno okužen razvijajoči se storžek porjavi in otrdi (foto: S. Radišek)

Figure 4: Hop Downy Mildew: Left – infected cones; top right – first-stage cone and leaf infection; bottom right – highly infected developing cone turns brown and hardens (photo: S. Radišek)



Slika 5: Vakuumski lovilec spor (Burkard) v hmeljišču (foto: S. Radišek)

Figure 5: Vacuum airborne spore trap (Burkard) in a hop field (photo: S. Radišek)

be recognized by their short and thick strings, as well as the yellowish down curled leaves (Figure 2). In favourable conditions, the underside of the leaves will turn a purplish-grey – formation of a conidiophore containing spores, which represents the source of subsequent secondary infections within the hop garden. On the upper surface of the leaves, it is manifested in the form of pale yellow spots, divided by veins; the spots will turn brown (Figure 3). Infected flowers turn brown and harden, and then fall off. The cone infection is developed in the bracts and bracteoles, which also turn brown (Figure 4). When young cones are infected, they are deformed, while in more developed cones, only individual bracts will turn brown.

Prevention of Downy Mildew today is based on integrated approaches, which include the cultivation of resistant varieties, phytosanitary measures, and the application of fungicides based on the reports of the prognostic department. Hop protection begins in spring with controlling the primary infection. Along with the mechanical removal of the infected buds during the pruning period and the basal spikes during the hop training period, the primary infection is control using systemic fungicides. The most commonly used are fungicides with the active ingredients fosetyl-

pred tem in glede na občutljivost sort. Spremljanje pojava sekundarne okužbe se prične nekje v prvi dekadi maja, ko v hmeljišča namestimo lovilce spor (slika 5) in pričnemo s sistematičnim spremljanjem dinamike infekcijskega pritiska. Na osnovi ulova spor, spremljanja meteoroloških dejavnikov z avtomatskimi agrometeorološkimi postajami in upoštevanjem razvojnega stadija rastlin ter občutljivosti sort nastaja na IHPS prognoza, s katero opozarjamo hmeljarje na pojav okužb in potrebo po varstvu rastlin.

» Kmet danes biti, je težko,
A biti kmet, je tudi' lepo:
Gre s polja v hlev in spet na polje,
nikoli preveč slabe volje.
Če je živina v hlevu zdrava
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obilno cvetja si naniza,
široko panoge razteza,
da ga pri delu v lica dreza,
mu kožo tu pa tam posname –
kmet hitro sapo spet zajame
in z novim dnem spet z mnogo volje
gre s polja v hlev in spet na polje.«

(Moja leta: Milka Povše)

AI and metalaxyl-M; the latter even manage to cure the infected rootstock. The application of systemic fungicides is recommended when over 3% of the plants in hop garden have been identified with the basal spikes. As basal spikes can occur even later in the development of the plant, fungicides can be applied based on the appearance of basal spikes in the previous year, and in accordance with variety sensitivity. The dynamic of secondary infection potential is systematic monitored from the first period of May, when spore traps are installed in hop fields (Figure 5). Based on number of trapped spores, monitoring of meteorological factors using automatic agrometeorological stations, and in consideration of the development stage of the plants and variety sensitivity, the Institute will elaborate a forecast with the purpose of notifying hop growers on possible infections and the required plant protection.

DRUŠTVO HMELJARJEV, HMELJARSKIH STAREŠIN IN PRINCES SLOVENIJE

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Želimo vam veliko delovnega poleta tudi v prihodnje.

**Janko Kos
župan**

KORUZNA VEŠČA, ZNANA ŠKODLJIVKA HMELJA

Dr. Magda Rak Cizej, dr. Sebastjan Radišek, Gregor Leskošek
Inštitut za hmeljarstvo in pivovarstvo Slovenije

Koruzna veščica je v slovenskih hmeljiščih, predvsem na območju Savinjske doline, že dolgo znana škodljivka hmelja. Škodo povzročajo njene ličinke, ki se zelo hitro zavrtajo v notranjost stebel in kasneje tudi v storžke hmelja. Tako zavirajo rast in razvoj rastlin, posledično sta zmanjšani količina in kakovost pridelka hmelja. Zelo napadene rastline imajo smrekast videz.

Populacija koruzne veščice je zadnjih deset let vse večja. Razloge za povečanje populacije lahko pripišemo več stvarim, med katerimi naj izpostavimo nepravčasno spravilo žetvenih ostankov gostiteljskih rastlin in prepozno pospravljenost koruzo s polj. V Sloveniji imamo v kolobarju velik odstotek njiv posejanih s koruzo, uporaba kontaktnih insekticidov v kmetijstvu s širokim načinom delovanja je vse manjša oziroma omejena, spremenjene so klimatske razmere, fitosanitarni higienski ukrepi se ne izvajajo idr. Vse to povečuje populacijo te škodljivke, ki ima na hmelju dve generaciji letno. Običajno je na hmelju povzročala pomembno gospodarsko škodo le druga generacija, v zadnjem času pa se soočamo z velikimi poškodbami, ki jih povzroča že tudi prva generacija. Zatiranje gosenic koruzne veščice s kontaktnimi insekticidi nima zadostnega učinka. V bodoče bo potrebno za njihovo zatiranje vpeljati nove, biološke metode, vsekakor pa je med najpomembnejšimi ukrepi dosledno izvajanje fitosanitarnih higienskih ukrepov. Ponovno bi v

EUROPEAN CORN BORER, A NOTORIOUS PEST IN HOP

Magda Rak Cizej, PhD, Sebastjan Radišek, PhD, Gregor Leskošek
Slovenian Institute of Hop Research and Brewing



Odrasla samička koruzne veščice (*Ostrinia nubilalis*) (foto: M. Rak Cizej)

Adult female European corn borer (*Ostrinia nubilalis*) (photo: M. Rak Cizej)



Svetlobna vaba za spremljanje metuljev koruzne veščice v hmeljišču (foto: M. Rak Cizej)

European corn borer adult monitoring light trap (photo: M. Rak Cizej)

The European corn borer has long ago been identified as a pest in Slovenian hop fields, especially in the region of the Savinja Valley. Damage is caused by their larvae, which will penetrate into the interior of the stalks and later even into the hop cones. They are thus responsible for stunted growth and the development of plants, which results in a substantial decrease in yield quality and quantity. Severely affected plants have a spruce-tree like appearance.

In previous decades, the European corn borer population has increased substantially. The reasons for this boom in the European corn borer population can be attributed to different factors, which primarily include: untimely storing leftovers of host plants after the harvest, as well as a delayed harvest of corn. In Slovenia, corn is grown on a large number of crop-rotating fields; the application of contact insecticides in agriculture with a wide spectre of pesticides is on the decline or has been restricted, the climate has changed, phytosanitary and hygienic measures are not implemented rigorously enough etc. The European corn borer lays eggs twice annually in the case of hop plants. As a rule, the most economic damage in hop cultivation was caused by the second generation, while lately, we have also been facing major damage which has been attributed to the first generation. The control of European corn borer caterpillars using contact insecticides has proven insufficiently

Sloveniji potrebovali odlok o zatiranju koruzne vešče, ki je veljal do leta 2001.

Na Inštitutu za hmeljarstvo in pivovarstvo Slovenije koruzno veščo spremljamo s svetlobno vabo že vrsto let. Podatke o njeni populaciji imamo od leta 1987, pred tem letom so jo spremljali le občasno. V zadnjem času stremimo k povečevanju števila opazovanih mest, saj bi s tem pridobili večje število podatkov, ki nam bodo služili pri pravočasnem napovedovanju zatiranja njenih gosenic. Poleg svetlobnih vab za spremljanje metuljev koruzne vešče v zadnjih treh letih uvajamo tudi feromonske vabe.



Feromonska vaba stožčaste oblike je alternativa svetlobni vabi (foto: M. Rak Cizej)

A pheromone-baited trap can be used as an alternative to the light trap (photo: M. Rak Cizej)

effective. In the future, new biological methods will be introduced in order to control these pests, while regular implementation of phytosanitary and hygienic measures will remain on the top of the list. In Slovenia, it would be wise to reinstate the Decision on the control of the European corn borer, which was valid until 2001.

At the Institute of Hop Research and Brewing, we have been monitoring the European corn borer population using light traps,

and have been collecting data on its population since 1987. Prior to that, it was only controlled sporadically. An increased number of observation points has resulted in more accurate predictions regarding caterpillar control, and in the last three years, the control of borers using pheromone-baited traps.



Jajčeca koruzne vešče (*Ostrinia nubilalis*) na spodnji strani hmeljevega lista in ličinke tik pred izleganjem iz jajčne lupine (foto: M. Rak Cizej)

European corn borer eggs (*Ostrinia nubilalis*) on the underside of the hop leaf, and larvae before hatching from the egg shell (photo: M. Rak Cizej)



Gosenica koruzne vešče, zavrtana v storž hmelja (foto: M. Rak Cizej)

A European corn borer found inside a hop cone (photo: M. Rak Cizej)



Gosenica koruzne vešče, zavrtana med trte hmelja (foto: M. Rak Cizej)

A European corn borer caterpillar boring through hop bines (photo: M. Rak Cizej)



Zaradi napada koruzne vešče hmeljna rastlina zaostane v rasti in je smrekaste oblike, deli rastlin se lahko tudi popolnoma posušijo (foto: M. Rak Cizej)

Due to the European corn borer infection, the growth of the hop plant will be stunted, and the plant will become spruce-tree shaped. Parts of the plant may dry up completely (photo: M. Rak Cizej)



Smrekasta rast hmelja in slabše oblikovani stranski poganjki kot posledici napada gosenic koruzne vešče prve generacije (foto: M. Rak Cizej)

The spruce-like growth of the hop plant and the poorly formed side shoots are the result of the first generation European corn borer infection (photo: M. Rak Cizej)



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PROBLEMATIKA NANAŠANJA FITOFARMACEVTSKIH SREDSTEV V HMELJIŠČIH

Gregor Leskošek, dr. Sebastjan Radišek, dr. Magda Rak
Cizej
Inštitut za hmeljarstvo in pivovarstvo Slovenije

V Sloveniji s svojo zakonodajo na področju kmetijstva med cilji kmetijske politike posebej poudarjamo varstvo kmetijskih zemljišč pred onesnaževanjem in nesmotrno rabo, prav tako tudi uresničevanje načel varstva okolja in ohranjanja narave. Ob temeljni gospodarski in socialni vlogi kmetijstva moramo biti usmerjeni v spodbujanje take sonaravne kmetijske dejavnosti, ki vzdržuje različnost živalskih in rastlinskih vrst ter ohranja rodovitnost tal ob varovanju naravnih pogojev za življenje v tleh, vodi in zraku.

Temeljna naloga tehnike aplikacije je smotno, gospodarno in za okolje sprejemljivo nanašanje ustrezno pripravljenih kemičnih pripravkov na ciljne površine.

ISSUE OF THE APPLICATION OF PLANT PROTECTION PRODUCTS IN HOP FIELDS

Gregor Leskošek, Sebastjan Radišek, PhD, Magda Rak
Cizej, PhD
Slovenian Institute of Hop Research and Brewing

Slovenian legislation regulating agriculture gives special emphasis in terms of the objectives of agricultural policy to the protection of agricultural land from pollution and improper use, as well as the realization of the principles of environmental protection and nature conservation. In addition to the economic and social role of agriculture, we must also be oriented towards promoting sustainable agricultural activity which maintains the diversity of animal and plant species and soil fertility while protecting the natural conditions for life in the ground, water and air.

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Torej, če jih hočemo učinkovito in varno uporabljati, moramo zelo veliko vedeti o njih, zelo dobro pa moramo poznati tudi ustrezne stroje in naprave, saj njihova primerna kakovost in pravilno ravnanje z njimi omogočata večjo učinkovitost kemičnih sredstev in manjše vnašanje nezaželenih snovi v okolje. Aplikacija FFS v hmeljiščih je zaradi specifičnosti nasada med zahtevnejšimi opravili. Hmeljišče je gost in visok nasad, pri medvrstni razdalji 2,4 m je na enem hektarju lahko tudi do 4200 rastlin. Pri nas so hmeljišča v povprečju visoka med 6 in 7 m, indeks listne površine pa je v odvisnosti od sorte med 9 in 13. Kljub intenzivnim prizadevanjem najti druge načine oz. postopke nanašanja FFS je pri nas še vedno najbolj razširjeno klasično pršenje hmeljišč. Pri tretiranju nasadov uporabljamo vlečene aksialne pršilnike, s kapaciteto zračnega puhala med 90000 m³ in 120000 m³, ki sesajo zrak zadaj ter ga pod kotom 90° izpihajo v nasad. V konvencionalni pridelavi se kljub številnim opravljenim poskusom še vedno uporablja dokaj velika količina vode. Priporočena poraba vode je tako med 300 in 400 litri na meter višine hmelja. Kljub veliki količini porabljene vode in zmogljivemu pršilniku pa vedno ne moremo zagotoviti enakomernosti nanosa FFS. Do lokalnih predoziranj pride predvsem v vrstah ob voznih poteh, kjer je delež depozita tako velik, da lahko pride do zlitja kapljic in odtekanja, medtem ko je kakovost nanosa v drugi in tretji vrsti od vozne poti predvsem v vrhu rastline bistveno slabša. Poleg zagotavljanja kakovostnega nanosa so z okoljskega vidika pomembna prizadevanja v smeri omejevanja zanašanja FFS izven območja tretiranja. V zadnjem času se pri uporabi določenih FFS vse bolj soočamo z velikimi varnostnimi razdaljami do voda I. in II. reda, veliko težav nastaja tudi v bližini urbanih naselij, kjer nepravilna politika na področju prostorsko ureditvenih planov ne upošteva in predvideva varovalnih pasov za trajne nasade, kar omejuje dosednji obseg pridelave hmelja. S strokovnim izrazom drift pri aplikaciji – nanašanju fitofarmaceutskih sredstev za varstvo rastlin – opisujemo zanašanje FFS izven območja tretiranja v okolje objektov, kjer se izvaja aplikacija. Zanašanje izven območja tretiranja je eden od pomembnih primarnih negativnih učinkov uporabe kemičnih sredstev za varstvo rastlin pred boleznimi in škodljivci. FFS lahko zanese tudi do nekaj deset metrov stran od mesta aplikacije. Posledica tega je kontaminacija neciljnih površin, rastlinstva, živali, voda, zemljišč in neposrednega bivanjskega okolja. Drift predstavlja obliko onesnaženja, ki je posledica tehnologije varstva rastlin. Poznamo veliko vrst driftov. Najbolj problematičen je neposredni aplikacijski drift, ki nastane zaradi gibanja zračnih tokov. Ti odnesejo kapljice ali prašne delce FFS izven območja tretiranja. Popolnoma se driftu ne moremo izogniti, lahko pa ga bistveno

application of properly prepared chemical preparations on the target surfaces. Therefore, if we wish to use them effectively and safely, we must have extensive knowledge of them, as well as the appropriate machines and devices, as their adequate quality and correct use enable a greater efficiency of chemical agents and lesser introduction of undesirable substances into the environment. Due to the specificity of the plantation, the application of PPPs in hop fields constitutes one of the most demanding tasks. A hop field is a dense and tall plantation, and with an inter-row distance of 2.4m, one hectare can accommodate up to 4,200 plants. The height of the hop fields in Slovenia is usually between six and seven metres, while the leaf area index is between nine and thirteen, depending on the variety. Despite intensive efforts to find new methods or procedures for the application of PPPs, conventional spraying of hop fields is still the most widespread in Slovenia. In the treatment of plantations, we use drawn axial sprayers with air blower capacities between 90,000m³ and 120,000m³, which draws air in at the back and blows it out into the plantation at a 90° angle. Despite the fact that many tests have been run, a relatively large amount of water is still used in conventional production. The recommended use of water is between 300 and 400l per metre of hop height. Despite the large amounts of water and the powerful sprayers, it still cannot be guaranteed that the PPPs are applied evenly. Local overdoses occur primarily in rows adjacent to driving paths, where the deposit is so great that drops can merge and run off, while the quality of application in the second and third rows from the driving path, especially at the top of the plants, is significantly lower. In addition to ensuring the quality of application, efforts in relation to limiting the drift of PPPs outside the area of treatment are also important from the environmental aspect. Recently, the use of certain PPPs has become increasingly difficult due to safety distances to waters of the first and second orders, and many problems are also arising in the vicinity of urban settlements, where the inadequate spatial planning policy does not allow and account for safety zones for permanent plantations, which limits the scope of hop production. In the application of plant protection products, the technical term drift describes the drift of PPPs outside the area of treatment into its surrounding environment. The drift of PPPs outside the treatment area is one of the most significant primary negative effects of the use of chemical agents for the protection of plants from diseases and pests. PPPs can drift up to several tens of metres away from the area of application. This results in the contamination of non-target areas, vegetation, animals, waters, ground and living environments. Drift is a form of pollution caused by

omejimo. Še težje kot neposrednemu aplikacijskemu driftu se izognemo drugim oblikam, ki se pojavijo po aplikaciji (izpiranje, hlapenje ipd.). Te druge oblike so bistveno manj regulirane v tehničnem smislu, ker tehnika aplikacije nanje bistveno ne vpliva. Na obvladovanje pojavov zanašanja »drifta« pri pršenju hmeljišč lahko v veliki meri vplivamo z uporabo tehničnih



Sodobni pršilnik z vgrajenimi šobami za zmanjševanje zanašanja in enostransko zračno zaporo (foto: G. Leskošek)

A modern sprayer fitted with drift reduction nozzles and one side fan coverage (photo: G. Leskošek)

rešitev, kot so šobe za zmanjševanje zanašanja ter enostranska zračna zapora puhala. Za zmanjševanje zanašanja v največji meri pa je potrebno tehniko aplikacije pri pršenju ob vodotokih, stanovanjskih, bivalnih in drugih objektih prilagoditi tako, da opravimo večkratne enostranske prehode. Vsekakor pa je treba upoštevati splošna načela dobre prakse varstva rastlin, ekološke in klimatske razmere v času škropljenja, mejne hitrosti ter smer vetra, najvišje dovoljene temperature, vodne erozijske procese idr.

plant protection technology. There are many types of drift. The most problematic is direct application drift, which occurs due to the movement of air streams which cause PPP drops or dust particles outside the area of treatment. Drift cannot be completely avoided, but it can be considerably reduced. Even more difficult to avoid than direct application drift are other forms which take place after application (flushing, evaporation, etc.). These forms are significantly less regulated in the technical sense, as the application technique has no significant effect on

them. Spray drift in the spraying of hop fields can be controlled primarily by using technical solutions such as drift reduction nozzles and one side fan coverage for blowers. To reduce spray drift as much as possible, the application technique must be adapted when spraying in the vicinity of watercourses and residential and other structures so that multiple runs are carried out on a single side. It is definitely necessary to follow the general principles of good practice for plant protection, ecological and climatic conditions during spraying, take into account the limit wind speeds and directions, the maximum temperatures, water erosion processes, etc.



SISTEM VODENJA KAKOVOSTI NA IHPS

*Marija Hribernik
Inštitut za hmeljarstvo in pivovarstvo Slovenije*

Prvi na Inštitutu za hmeljarstvo in pivovarstvo Slovenije (IHPS) smo sistem vodenja kakovosti uvedli na Oddelku za agrokemijo in pivovarstvo leta 1998 in oddali vlogo na Urad za standardizacijo in meroslovje za akreditacijo preskuševalnega laboratorija po zahtevah standarda SLS EN 45001. Zaradi požara in uničenja celotnega klasičnega laboratorija smo morali vlogo zamrzniti. Prav v tem času pa sta se spremenila tudi veljavni standard in akreditacijska hiša, zato smo po obnovi laboratorija

QUALITY MANAGEMENT SYSTEM AT THE SIHRB

*Marija Hribernik
Slovenian Institute of Hop Research and Brewing*

As the first department of the Slovenian Institute of Hop Research and Brewing (SIHBR) to do so, the Department of Agrochemistry and Brewing implemented a quality management system in 1998 and submitted an application at the Metrology Institute for the accreditation for a testing laboratory compliant with the requirements of the SLS EN 45001 standard. Due to a fire and the subsequent complete destruction of the conventional laboratory, we were forced to put

ponovno vložili vlogo za pridobitev akreditacije po novem standardu SIST EN ISO/IEC 17025 pri akreditacijski hiši Slovenska akreditacija. V letu 2003 smo med prvimi preskuševalnimi laboratoriji v Sloveniji pridobili akreditacijsko listino št. LP-025 za področje preskušanja piva, hmelja in začimb. Z akreditacijsko listino za navedena področja je bilo pogojeno imenovanje IHPS kot pooblaščen organizacije za določanje minimalnih kakovostnih zahtev pri certificiranju pridelka hmelja, za ugotavljanje skladnosti piva in ugotavljanje skladnosti soli, gorčice, začimb, juh, omak, pripravljenih solat, beljakovinskih izdelkov, kvasa in njim podobnih izdelkov.

Na Oddelku za varstvo rastlin je sistem vodenja kakovosti podan v poslovniki kakovosti za posamezna področja, ki jih oddelek izvaja. Naloge Laboratorija za varstvo rastlin, Javne službe zdravstvenega varstva

the application on hold. During this exact period, there was also a change of the applicable standard and the accreditation authority, and after the renovation of the laboratory, we thus resubmitted the application for accreditation in accordance with the new SIST EN ISO/IEC 17025 standard at the new accreditation authority, Slovenian Accreditation. In 2003, we were among the first testing laboratories in Slovenia to obtain Accreditation Certificate no. LP-025 for beer, hop and spice testing. The accreditation certificate for these fields was a condition for SIHBR to become an organization authorized to set minimum quality requirements for the certification of hop products, assess the conformity of beer and assess the conformity of salts, mustards, spices, soups, sauces, ready-made salads, protein products, yeast and similar products.

At the Plant Protection Department, the quality management system is specified in the quality manual for the individual fields of activity of the department. Since 2004, the tasks of the Plant Protection Department, the tasks of the Public Plant Health Service according to the public authority and the tasks of the Public Plant Health Service have been carried out in accordance with the Quality Manual of the Plant Protection Department, which encompasses the stipulations of the SIST EN ISO/IEC 17025 standard. On the basis of the fulfilment of the requirements of this quality manual, the Plant Protection Department has been granted a concession for the performance of the public service of plant health protection in the area of the monitoring and prediction of harmful organisms, and the public authority for the performance of plant health protection tasks encompassing diagnostic tests in the areas of mycology, virology, bacteriology and entomology.

Experiments and performance tests on PPPs in accordance with good experimental practice have been conducted since 2007 in accordance with the Quality Manual for the Plant Protection Department – GEP. On the basis of the provisions of this manual, the SIHRB has been issued a certificate of compliance with the conditions of good experimental practice – GEP for the requirements of the registration



Akreditacijska listina za področje preskušanja piva, hmelja in začimb
Accreditation certificate for beer, hop, and spice testing.

rastlin na podlagi javnega pooblastila in Javne službe zdravstvenega varstva rastlin od leta 2004 potekajo v skladu s Poslovníkom kakovosti za Oddelek za varstvo rastlin, ki zajema določila standarda SIST EN ISO/IEC 17025. Na osnovi izpolnjevanja določil tega poslovníka je Oddelku za varstvo rastlin dodeljena koncesija za izvajanje javne službe zdravstvenega varstva rastlin na področju opazovanja in napovedovanja škodljivih organizmov in javno pooblastilo za opravljanje nalog zdravstvenega varstva rastlin, ki zajemajo diagnostične preiskave s področja mikologije, virologije, bakteriologije in entomologije.

Opravljanje poskusov in testov učinkovitosti FFS v skladu z dobro poskusno prakso poteka od leta 2007 v skladu s Poslovníkom kakovosti za Oddelek za varstvo rastlin – GEP. Na osnovi določil tega poslovníka je bilo IHPS izdano potrdilo o izpolnjevanju pogojev dobre poskusne prakse – GEP za potrebe registracije in ocene FFS za naslednje teste podatkov o učinkovitosti: prehodni testi, testiranje učinkovitosti in fitotoksičnost za ciljne rastline.

S Poslovníkom kakovosti za IHPS – Uradno potrjevanje razmnoževalnega materiala in sadik hmelja pa imamo kot certifikacijska organizacija za proizvode od leta 2007 opredeljen sistem kakovosti v skladu z zahtevami standarda SIST EN 45011 za uradne potrditve sadik hmelja in za kontrolo in certificiranje pridelka hmelja. Na osnovi določil tega poslovníka je IHPS pooblaščen za vodenje postopka in za odločanje v postopku uradne potrditve sadik hmelja, razen kategorije certificirane sadike A, ter za kontrolo in certificiranje pridelka hmelja. Z omenjeno odločbo mu je dodeljeno javno pooblastilo za preverjanje skladnosti hmelja in izdajanje listin o skladnosti hmelja.

Za vse ostale dejavnosti na IHPS pa deluje sistem vodenja kakovosti v skladu s standardom SIST EN ISO 9001, ki smo ga s pomočjo Poslovníka kakovosti implementirali v prakso letos.

and the evaluation of PPP for the following data and performance tests: transient tests, performance testing, phytotoxicity to target plants.

As a product certification organization, the SIHRB has had a quality management system compliant with the requirements of the SIST EN 45011 standard for the official certification of hop plants and inspection and certification of hop products since 2007, defined by the Quality Manual for the SIHRB – Official Certification of Hop Propagating Material and Hop Plants. On the basis of the provisions of this manual, the IHPS is authorized to manage and decide on procedures for the official certification of hop plants, except for “A certified plants”, and for the inspection and certification of hop products. The above decision gives it public authority to assess hop compliance and issue hop compliance certificates.

All other activities at the SIHRB are regulated by a quality management system compliant with the SIST EN ISO 9001 standard, which was implemented into practice this year using the Quality Manual.

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MEDNARODNO PROJEKTNO SODELOVANJE INŠTITUTA V ŽALCU V OKVIRU CENTRA ZA UPRAVLJANJE S SUŠO V JUGOVZHODNI EVROPI

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INTERNATIONAL PROJECT COOPERATION OF THE INSTITUTE IN ŽALEC WITHIN THE DROUGHT MANAGEMENT CENTRE FOR SOUTH-EASTERN EUROPE

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Slovenian Institute of Hop Research and Brewing



DMCSEE
Drought Management Centre
for Southeastern Europe



V zadnjih desetletjih je imela suša pomemben vpliv na kmetijstvo držav Jugovzhodne Evrope. Še posebej velja izpostaviti izrazita sušna obdobja z gospodarsko škodo v letih 1993, 1994, 1998 in 2003. Inštitut za hmeljarstvo in pivovarstvo Slovenije se je aktivno odzval v konzorciju za prijavo na projektni natečaj v shemi Transnacionalnega teritorialnega sodelovanja in v letih od 2009 do 2012 uspešno sodeloval v mednarodnem projektu **Drought Management Centre for South East Europe** (DMCSEE).

Glavni projektni cilj je bil naravnani na izboljšanje pripravljenosti na pojav suše s pripravo ocene tveganja

In the last decades, drought has had a significant effect on the agriculture of the countries of South-eastern Europe. The drought periods of 1993, 1994, 1998 and 2003, which brought economic loss, are of special importance. The Slovenian Institute for Hop Research and Brewing has responded actively within a consortium for the application for a project contest within the Transnational Territorial Cooperation Programme and successfully participated in an international project of the **Drought Management Centre for South East Europe** – DMCSEE in the period of 2009 to 2012.



*Izmenjava izkušenj
dobre prakse namakanja
hmeljišč na mednarodni
delavnici DMCSEE v Žalcu
(foto: B. Čremožnik)*

*Good practice exchange
in irrigation of hop fields
during the DMCSEE
international workshop in
Žalec (photo: B. Čremožnik)*

posledic suše in vzpostavitev sistema zgodnjega opozarjanja. V konzorcij DMCSEE je bilo vključenih 15 partnerjev iz 10 držav JV Evrope. Celoten projekt je koordiniral dr. Gregor Gregorič z Agencije RS za okolje. Partnerstvo je zajemalo hidrometeorološke zavode, raziskovalne organizacije in podjetja za upravljanje z vodami iz držav Jugovzhodne Evrope, projektno skupino na IHPS pa je vodil prof. dr. Martin Pavlovič. Projektna skupina inštituta v Žalcu je analizirala različne vremenske parametre in arhivske podatke ETP od leta 1995 do leta 2005, dopolnjevala izhodišča za svetovanje pri namakanju hmeljišč v Sloveniji, zasnovala model za napovedovanje vpliva vremenskih razmer (padavine, temperature, sončno sevanje, relativna zračna vlaga) na količino in kakovost pridelka hmelja, predlagala izboljšave za informativno izmenjavo vsebin na spletnem portalu projekta www.dmcsee.eu in publicirala del projektnih rezultatov. Na sedmih projektnih sestankih konzorcija DMCSEE na Madžarskem, v Grčiji, Makedoniji, Srbiji in Sloveniji so se udeležili tudi različnih tematskih delavnic.

Po zaključku bodo celotni projektni rezultati konzorcija sestavni del aktivnosti načrtovanega Centra za upravljanje s sušo JVE z namenom: (i) nadgrajevanja pomanjkljivega informiranja o pojavih sušnih razmer na lokalni ravni; (ii) priprav, poenotenja in implementacije metodologije monitoringa in ocenjevanja sušnih razmer za mednarodne primerjave in analize na območju JVE – še posebej za sektorje, ekonomsko odvisne od virov vode (kmetijstvo, turizem); (iii) izkoriščanja informacij za zmanjševanje škode v prizadetih gospodarskih sektorjih; (iv) analiziranja sektorske in regionalne ranljivosti zaradi sušnih razmer; (v) koordinacije mrež tematsko sorodnih ustanov in (vi) dopolnitve strategij ukrepov EU za omilitev razmer zaradi posledic suše.



Člani projektnega konzorcija DMCSEE na ogledu hmeljišč v Savinjski dolini (foto: arhiv IHPS)

Members of the DMCSEE project consortium during their hop fields tour in the Savinja Valley (photo: the Institute archive)

The main objective of the project was to improve drought preparedness by creating a risk assessment of the consequences of drought, and establishing an early warning system. The *DMCSEE* consortium included 15 partners from 10 countries of SE Europe. The entire project was coordinated by Dr. Gregor Gregorič of the Slovenian Environmental Agency. The partnership included hydrometeorological institutes, research organizations and water management companies from the countries of South-eastern Europe. The project group at the institute in Žalec was led by Prof. Martin Pavlovič, PhD.

The project group of the Institute in Žalec analysed archive of various weather parameters (ET data) for the period of 1995 to 2005, supplemented the bases for consultation and advisory service on hop field irrigation in Slovenia, designed a model for the prediction of the impact of weather attributes (precipitation, temperatures, solar radiation, relative atmospheric humidity) on the quantity and quality of the hops produced, proposed improvements for the informative exchange of content at the web portal of the project, www.dmcsee.eu and published part of the project results. They have also participated in various thematic workshops at seven project meetings of the *DMCSEE* consortium in Hungary, Greece, Macedonia, Serbia and Slovenia.

Upon conclusion, the complete project results of the consortium will become a constituent part of the activity of the planned Drought Management Centre for South-eastern Europe with the purpose of (i) the improvement of inadequate informing about the occurrence of drought at a local level; (ii) the preparation, unification and implementation of a methodology for the monitoring and assessment of drought conditions for international comparisons and analyses in the region of South-eastern Europe – especially for sectors which are economically dependent on water sources (agriculture, tourism); (iii) the use of information to reduce losses in affected economic sectors; (iv) the analysis of sectoral and regional vulnerability due to drought; (v) the coordination of networks of thematically related institutions; and (vi) the supplementation of the strategies of EU measures for the amelioration of conditions caused by drought.



IZOBRAŽEVANJE NOVIH KADROV

Dr. Iztok Jože Košir
Inštitut za hmeljarstvo in pivovarstvo Slovenije

Inštitut za hmeljarstvo in pivovarstvo Slovenije se je ves čas svojega delovanja soočal s problematiko izobraževanja na dveh ravneh. Na eni strani kot institucija, ki skrbi in izvaja izobraževalni proces, na drugi strani pa je bilo treba poskrbeti za izobraževanje in nadgrajevanje znanja lastnih zaposlenih. Na eni ravni je igral vlogo, ki mu je bila pravzaprav zaupana že s samo ustanovitvijo, in sicer, da njegovi strokovnjaki svoje strokovno znanje, rezultate lastnega in tujega raziskovalnega in znanstvenega dela prenašajo v prakso do uporabnikov, hmeljarjev. To je počel in še vedno izvaja preko različnih izobraževanj in strokovnih srečanj s potencialnimi uporabniki njegovih znanj. Na tem mestu velja posebej omeniti hmeljarski seminar, ki se izvaja enkrat letno in je bil v letu 2012 že 49. po vrsti. Hkrati potekajo prenosi znanja in praktičnih strokovnih nasvetov vse leto preko organiziranih tehnoloških sestankov in rednega izdajanja informacij za različna področja kmetijske pridelave. V letu 2012 je IHPS preko mednarodnega projekta Leonardo da Vinci izvedel tudi prvo izobraževanje v okviru Nacionalne poklicne kvalifikacije za pridobitev uradno priznanega naziva hmeljar/hmeljarka.

Na drugi strani pa je moral inštitut ves čas skrbeti za izobraževanje in razvoj svojih lastnih kadrov, saj zaradi specifičnosti večine znanj ni bilo možno pridobiti v času rednega šolanja. Poleg tega je in mora kot vrhunska institucija skrbeti za razvoj tudi najvišje izobraženih zaposlenih. V preteklosti so se zaposleni uspešno vključevali v tako imenovane programe izobraževanja mladih raziskovalcev, kjer so pod mentorstvom večinoma zunanjih sodelavcev dosegali najvišje akademske nazive. V zadnjem času inštitut uspešno pridobiva nova mentorska mesta svojih zaposlenih, tako da trenutno poteka izobraževanje dveh mladih raziskovalcev, ki se jima bosta konec leta pridružila še dva nova.



EDUCATION OF NEW PERSONNEL

Iztok Jože Košir, PhD
Slovenian Institute of Hop Research and Brewing

Throughout its existing, the Slovenian Institute of Hop Research and Brewing has faced the issue of education – education on two levels. On one hand as an institution which manages and implements an educational process, and on the other hand for educating and upgrading the knowledge of its own employees. On one level, it has played the role which had actually been given to it with its establishment. i.e. that its experts transfer their expertise and the results of their own research and scientific work, as well as that of others, onto hop growers for practical implementation. It has done and still does this through various educational courses and professional meetings with potential users of its knowledge. In relation to this, it is particularly worth mentioning the Hop Seminar, which is held annually – the 2012 Seminar was the 49th consecutive Seminar. The transfer of knowledge and practical expert advice takes place throughout the year at organized technological meetings with the regular publication of information for various fields of agriculture. In 2012, through an international project called Leonardo da Vinci, the Institute also carried out the first educational course within the National Vocational Qualifications for obtaining the officially recognized title of hop grower.

On the other hand, the Institute has always had to take care of the education and development of its own personnel, as, due to its specificity, most of the required knowledge could not be obtained through regular education. Furthermore, it is an elite institution and must, as such, ensure the development of even the most highly educated of its employees. In the past, its employees have successfully participated in so-called educational programmes for young researchers, where, mostly under the mentorship of external partners, they obtained the highest academic titles. Lately, the Institute has successfully been gaining new mentor positions for its employees, and two young researchers are thus currently being trained, and will be joined by two more at the end of the year.



48. seminar o hmeljarstvu
z mednarodno udeležbo

48th Hop Seminar
with international participation



Education and Culture DG

Lifelong Learning Programme

PROGRAM NACIONALNE POKLICNE KVALIFIKACIJE ZA HMEJARSTVO

*Dr. Martin Pavlovič, mag. Nataša Ferant, Monika Oset
Luskar, dr. Barbara Čeh
Inštitut za hmeljarstvo in pivovarstvo Slovenije*

Mednarodni projekt **Vseživljenjsko izobraževanje v hmeljarstvu** (Hop industry lifelong learning program - LdV Hop School), ki ga koordinira Inštitut za hmeljarstvo in pivovarstvo Slovenije, je uvrščen v Evropski program sodelovanja prenosa inovacij na področju izobraževanja in usposabljanja med šestimi partnerji iz Češke, Francije in Slovenije. Aktivnosti projekta vključujejo izmenjavo

NATIONAL VOCATIONAL QUALIFICATIONS PROGRAMME FOR HOP GROWING

*Martin Pavlovič, PhD, Nataša Ferant, MSc, Monika Oset
Luskar, Barbara Čeh, PhD
Slovenian Institute of Hop Research and Brewing*

The Hop Industry Lifelong Learning Programme (LdV Hop School) international project, which is coordinated by the Slovenian Institute for Hop Research and Brewing, is part of a European cooperation programme for the transfer of innovations in education and training between six partners from the Czech Republic, France and Slovenia. The project activities include the exchange of professional hop growing practices, the transfer of professional education contents in relation to hop growing and the preparation of technical documents for a certified Hop Grower national vocational qualifications (NVQ) programme. This programme is one of the most important results of the project.

The objective of the NVQ programme is to record the results of the education and experience obtained throughout life, which are equivalent to the knowledge and skills obtained within the education system.

In the preparation and formulation of the national vocational qualifications (NVQ) for hop growing, we formed a professional standard and catalogue of knowledge and skills, which serve as a basis for the implementation of the Hop Grower NVQ programme. The organizational and procedural part of the preparation of the programme was managed by a Slovenian partner, the School Centre of Slovenske Konjice, while the technical part was handled by the Slovenian Institute for Hop Research and Brewing. In 2012, we already carried out the first educational course for a test group of ten interested candidates, who attended the course as a basis for the



Člani projektne skupine iz Slovenije, Francije in Češke (foto: arhiv IHPS)

The project group includes members from Slovenia, France, and the Czech Republic (photo: the Institute archive)

strokovne prakse pridelave hmelja, prenos vsebin strokovnega izobraževanja s področja hmeljarstva in pripravo strokovnih gradiv za **certificiran program nacionalne poklicne kvalifikacije (NPK) Hmeljar/hmeljarka**. Ta program je tudi eden od pomembnejših rezultatov projekta.

Cilj programa NPK je v beleženju rezultatov učenja in izkušenj, ki jih pridobivamo vse življenje in so enakovredni znanju in spretnostim, pridobljenim v

šolskem sistemu.

Pri pripravi in oblikovanju NPK Hmeljar/hmeljarka smo oblikovali **poklicni standard in katalog strokovnih znanj in spretnosti**, ki sta osnova pri izpeljavi programa NPK Hmeljar/hmeljarka. Organizacijski in postopkovni del priprave programa je vodil slovenski partner Šolski center Slovenske Konjice - Zreče, strokovni del pa Inštitut za hmeljarstvo in pivovarstvo Slovenije. Že v letu 2012 smo izvedli prvo izobraževanje za poskusno skupino desetih zainteresiranih kandidatov, ki so obiskovali to izobraževanje kot osnovo za preverjanje in potrjevanje programa NPK.

V sklopu projekta so z izobraževanjem pridobili licenco za preverjanje in potrjevanje NPK trije strokovnjaki IHPS.

V smislu čim bolj izčrpnega poteka izobraževanja smo izdali v okviru projekta tudi priročnik **Hmelj – od sadike do storžkov**, ki zajema vsebine, potrebne za program NPK Hmeljar/hmeljarka. Priročnik obsega več kot sto strani z veliko nazornimi barvnimi fotografijami. Vsebina priročnika je prikazana tudi na DVD (kot e-vsebine). Oboje lahko kupite na IHPS.

Na podlagi obstoječega znanja in kompetenc s področja hmeljarstva, dopolnjenega na izobraževanju, bodo zainteresirani lahko vstopili v postopek priznavanja in potrjevanja ter si pridobili **nacionalno poklicno kvalifikacijo Hmeljar/hmeljarka**. Ta javno veljavna listina bo **uradna potrditev znanj in spretnosti, ki jih imajo kot posamezniki**.

Zanimanje med hmeljarji za to poklicno kvalifikacijo je veliko, saj do sedaj za hmeljarstvo kot panogo ni bilo sistema potrjevanja in preverjanja znanj, spretnosti in kompetenc.

Na osnovi pridobljenih izkušenj v sklopu projekta bomo ustrezno usposobljeni za izvajanje izobraževanja v smislu



Kandidati za NPK Hmeljar/hmeljarka na terenu spoznavajo škropilno tehniko v hmeljarstvu (foto: M. Oset Luskar)

Hop growers' NVQ candidates acquainting themselves with sprinkler techniques in hop cultivation (photo: M. Oset Luskar)

testing and certification of the NVQ programme. As part of the project, three institute's experts obtained licences for NVQ testing and certification.

In order to ensure that the educational course is as extensive as possible, we have also issued a manual entitled *Hops – from seedling to cones*, which includes all the contents required for the Hop Grower NVQ programme. The manual is over a hundred pages long and features numerous illustrative colour photographs. The contents of the manual are also available on DVD as e-content. Both can be purchased at the institute in Žalec.



Kandidati za NPK Hmeljar/hmeljarka na izobraževanju na Inštitutu za hmeljarstvo in pivovarstvo Slovenije – teoretični del, junij 2012 (foto: N. Ferant)

Hop growers' NVQ candidates in training at the Slovenian Institute of Hop Research and Brewing – theoretical part, June 2012 (photo: N. Ferant)

On the basis of their existing knowledge and competencies in relation to hop growing, which is complemented by the training course, interested candidates can participate in the process of recognition and certification and obtain national vocational qualifications for hop growing. This public document serves as an official certificate confirming the knowledge and skills they possess as individuals.

usposabljanja hmeljarjev za pridobivanje nacionalne poklicne kvalifikacije.

Za izvajanje nalog akcijskega programa EU **Vseživljenjsko učenje** je v Sloveniji pooblaščen javni zavod Center Republike Slovenije za mobilnost in evropske programe izobraževanja in usposabljanja (www.cmepius.si). Cilj programa je prispevati k razvoju EU kot družbe z vrhunskim znanjem, trajnostnim gospodarskim razvojem, več in bolj kakovostnimi delovnimi mesti ter večjo socialno kohezijo ob zagotavljanju dobrega varstva okolja za prihodnje generacije. Program pospešuje izmenjavo, sodelovanje in mobilnost med sistemi izobraževanja in usposabljanja v EU.



EKOMUZEJ HMELJARSTVA IN PIVOVARSTVA SLOVENIJE – NOVI SOSED INŠTITUTA ZA HMELJARSTVO IN PIVOVARSTVO SLOVENIJE

Mag. Nataša Ferant, Sabina Palir
Inštitut za hmeljarstvo in pivovarstvo Slovenije, ZKŠT
Žalec

Ekomuzej hmeljarstva in pivovarstva Slovenije je odprl svoja vrata konec novembra 2009 v Žalcu, na naslovu Cesta Žalskega tabora 2. Nahaja se v stari obnovljeni sušilnici Inštituta za hmeljarstvo in pivovarstvo Slovenije in je urejen v štirih nadstropjih. Je osrednji in edini tovrstni ekomuzej v Sloveniji. Že od samega začetka je projekt vodila Občina Žalec. Danes ga upravlja Zavod za kulturo, šport in turizem Žalec (ZKŠT).

V njem so zbrane zgodbe o življenju hmeljarjev nekoč in danes ter predmeti, povezani s hmeljarstvom. Predstavljena so oblačila, običaji, načini preživljanja hmeljarjev, številni predmeti in orodja za pridelavo in predelavo hmelja.

Zbirka je bila zbrana s pomočjo donatorjev in njihove dokumentacije, fotografij in spominov. Ekomuzej

There is great interest for these vocational qualifications among hop growers, as there has not been an adequate educational programme for hop growing as an industry until now.

Based on the experience we have gained during the implementation of the project, we will be adequately trained to carry out educational courses to train hop growers for obtaining national vocational qualifications.

In Slovenia, the tasks of the “Lifelong Learning” action programme of the EU are carried out by the Centre of the Republic of Slovenia for Mobility and European Educational and Training Programmes (www.cmepius.si). The objective of the programme is to contribute to the development of the EU as a society with superior knowledge, sustained economic development, more and better jobs and greater social cohesion, while ensuring the protection of the environment for future generations. The programme promotes exchange, cooperation and mobility between education and training systems in the EU.

ECOMUSEUM OF HOP GROWING AND BREWING OF SLOVENIA – THE NEW NEIGHBOUR OF THE SLOVENIAN INSTITUTE OF HOP RESEARCH AND BREWING

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The Ecomuseum of Hop Growing and Brewing of Slovenia opened its doors at the end of November 2009 in Žalec at Cesta Žalskega tabora 2. It is located in the renovated former drying house of the Slovenian Institute of Hop Research and Brewing, and spans four floors. It is the central and only ecomuseum of its kind in Slovenia. Since its very beginning the project has been led by the Žalec municipality. Today is managed by Center for Culture, Sport and Tourism.

It features stories about the lives of hop growers in the past and present, and objects related to hop growing. It displays the clothing, customs and livelihoods of hop growers, as well as numerous objects and tools used for growing and processing hops.

hmeljarstva in pivovarstva združuje preteklost, sedanjost in prihodnost na področju hmeljarstva in pivovarstva ter je povezan z okoljem in ljudmi, ki živijo v njegovi okolici. S pomočjo zgodbe ekomuzeja in preko vstopno informacijskih točk v šestih občinah Spodnje Savinjske doline (Schwentnerjeva hiša na Vranskem, VIT Tabor, prireditveni prostor – kozolec v Braslovčah, grad Komenda na Polzeli, muzejska zbirka v Preboldu in Savinova hiša v Žalcu) spoznamo pomen hmeljarstva za Spodnjo Savinjsko dolino.

Predstavitev ekomuzeja po nadstropjih

4. nadstropje – začasni razstavni depo (nekoč zelena etaža sušilnice):

- hmeljarska identiteta Spodnje Savinjske doline,
- hmeljarske šege,
- socialni in družbeni položaj obiralcev hmelja,
- socialni in družbeni položaj velikih in malih hmeljarjev,
- hmeljarsko delo na družbenih posestvih,
- prehrana, obleka, spanje,
- zaslužki obiralcev, hmeljarjev, kmečkih delavcev na zadružnih posestvih ipd.

3. nadstropje – nekoč vmesna etaža sušilnice:

- predstavitev Inštituta za hmeljarstvo in pivovarstvo Slovenije.

2. nadstropje – začasni razstavni depo (nekoč suha etaža sušilnice):

- orodje in stroji (kultivatorji, škropilnice) za pridelavo hmelja,
- predstavitev dveh največjih pivovarn v Sloveniji (Pivovarna Laško in Pivovarna Union),
- razstava o žalskem pivovarju Simonu Kukcu.

1. nadstropje – nekoč pisarne IHPS:

- otroške učilnice in dve stari kotlovnici.

Pritličje:

- recepcija s trgovinico in degustacijska soba.

Strokovno zasnovo in postavitve začasnih razstavnih depojev je izvedel Pokrajinski muzej Celje, ki tudi strokovno bdi nad zbirko predmetov, fotografij.

V prvem letu delovanja je bil zabeležen pozitiven odnos



Ekomuzej hmeljarstva in pivovarstva Slovenije je v stavbi bivše sušilnice IHPS (foto: arhiv ZKŠT)

The Ecomuseum of Hop Growing and Brewing of Slovenia is located in the former dryer of the Institute (photo: the ZKŠT archive)

The collection was compiled with the help of donors and their documents, photographs and memories. The Ecomuseum of Hop Growing and Brewing combines the past, present and future of hop growing and brewing and is connected to its surroundings and the people who live in its surroundings. In addition to the stories of the Ecomuseum, it is also possible to learn about the importance of hop growing for the Lower Savinja Valley through information access points in six municipalities of the Lower Savinja Valley (Schwentner House in Vransko, IAP Tabor, event venue – hayrack in Braslovče, Komenda Castle in Polzela, museum collection in Prebold and Savin House in Žalec).

Floor presentation of the Ecomuseum:

4th floor – temporary exhibition depot:

- hop-growing identity of the Lower Savinja Valley,
- hop-growing customs,
- social status of hop pickers,
- social status of large and small hop growers,
- hop growing on common land,
- food, clothing, sleep,
- earnings of hop pickers, hop growers, workers on cooperative farms, etc.

3rd floor

- presentation of the Slovenian Institute of Hop Research and Brewing

2nd floor – temporary exhibition depot:

prebivalcev Spodnje Savinjske doline do Ekomuzeja hmeljarstva in pivovarstva Slovenije in njegovih storitev. Število obiskovalcev in prireditve narašča iz leta v leto.

Program, ki ga izvajajo v ekomuzeju, je pester in zanimiv za vse generacije, od najmlajših pa do najstarejših. Poleg osnovnega vodenja po muzeju nudijo tudi kostumirana vodenja za najmlajše, praznovanja rojstnih dni in ostale programe za šolske in predšolske skupine. Med letom izvajajo številne otroške ustvarjalnice in delavnice, s poudarkom na interaktivnem spoznavanju hmelja. Pomladi in jeseni vsak prvi konec tedna v mesecu organizirajo projekt Ekofest, katerega bistvo je trajnostni razvoj in vključuje poleg predavanj tudi ekotržnico in sejem. V ekomuzeju se odvijajo tudi poroke, številne predstavitve, predavanja in srečanja.

Vsebinsko ekomuzeja bogatijo tudi prireditve, povezane s hmeljem in hmeljarstvom, ki se odvijajo v Spodnji Savinjski dolini. Te so: postavljanje hmeljev, začetek obiranja hmelja, obiranje hmelja na star način, pohod po hmeljski poti, dan hmeljarjev, hmeljarski likof.

Ponudbo Ekomuzeja hmeljarstva in pivovarstva Slovenije je marca letos dopolnilo tudi hišno pivo Kukec – Savinjsko pivo, ki se ga lahko pokusi v degustacijski sobi muzeja. Pivo je zvarjeno na osnovi najboljšega savinjskega hmelja, ime pa je dobilo po pomembnem pivovarju in hmeljarju Savinjske doline, Simonu Kukcu.



Zgodovina hmeljarjenja, pridelek – storžki hmelja in oprava hmeljarske starešine in princeze so razstavljeni v 4. nadstropju Ekomuzeja hmeljarstva in pivovarstva Slovenije (foto: arhiv ZKŠT)

The history of hop growing, harvest – hop cones and the outfits of the hop elder and the princess are exhibited on the 4th floor of the Ecomuseum of Hop Growing and Brewing (photo: the ZKŠT archive)

- tools and machines (cultivators, sprinklers) used in hop growing,
- presentation of the two largest breweries in Slovenia (the Laško Brewery and the Union Brewery),
- exhibition about Simon Kukec, a brewer from Žalec.

1st floor

- children's classrooms and two old boiler rooms

Ground floor

- reception hall with a shop and a tasting room

The technical design and set-up of the temporary exhibition depots was carried out by the Celje Regional Museum, which still keeps an expert eye on the collection of objects and photographs.

A positive attitude of the inhabitants of the Lower Savinja Valley towards the Ecomuseum and its services was noted in the first year of its operation. The number of visitors and events is increasing from year to year.

The programme of the Ecomuseum is diverse and interesting for all generations, from the youngest to the oldest. In addition to regular tours around the museum, they also offer costumed tours for the youngest, birthday celebrations and other programmes for school and preschool groups. Throughout the year, they hold numerous workshops for children, with an emphasis on

interactive learning about hops. During spring and autumn, every first weekend of the month, they organize an Ekofest project, the essence of which is sustained development and which, in addition to lectures, includes an eco market and eco fair. The Ecomuseum also hosts weddings and numerous presentations, lectures and meetings.

The contents of the Ecomuseum are also complemented by events related to hops and hop growing which take place in the Lower Savinja Valley. This includes: putting up hop poles, the start of the hop harvest, old-fashioned hop harvests, hikes along the hop trail, Hop Growers' Day and the hop pickers' feast.

The offer of the Ecomuseum of Hop Growing and Brewing of Slovenia received a new addition this March – the Kukec house beer, a Savinja region beer, which is available at the tasting room of the museum. The beer is brewed on the basis of the best hops of the Savinja region and is named after an important brewer and hop grower of the Savinja Valley, Simon Kukec.

Kot že rečeno, je Ekomuzej hmeljarstva in pivovarstva Slovenije že od samega začetka v upravljanju ZKŠT Zavod za kulturo, šport in turizem Žalec, ki poleg nadgradnje vsebin muzeja vsako leto tudi poskrbi, da se zbirka ekomuzeja, ki je »živa« zbirka, nenehno dopolnjuje in bogati. Kot takšna je umeščena poleg Inštituta za hmeljarstvo in pivovarstvo Slovenije, ki nudi strokovno podporo in odgovore na prenekatera vprašanja o hmeljarstvu in pivovarstvu.

As mentioned, the Ecomuseum of Hop Growing and Brewing of Slovenia has been managed since its very beginning by the Žalec Institute for Culture, Sport and Tourism, which, in addition to upgrading the contents of the museum, ensures that the collection of the Ecomuseum, which is a "live" collection, is constantly supplemented and enriched. As such, it is located next to the Slovenian Institute of Hop Research and Brewing, which offers professional support and answers to any and all questions about hop growing and brewing.

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