
"Slovenski čebelar" (The Slovenian Beekeeper), is a monthly magazine, the oldest regularly published specialist periodical in Slovenia. It is published by the Slovenian Beekeepers' Association (Čebelarska zveza Slovenije).

This article was initiated by a semen collection trip to Slovenia by the Washington State University Bee Team. Beekeepers asked for my impressions of Carnica in Slovenia. Translations in English appear after the Slovenia article, below.

# Vtisi o kranjski čebeli z obiska v Sloveniji

22. junija letos je bila s pomočjo dr. Aleša Gregorca na delovnem obisku Slovenije ameriška ekipa iz Univerze Washington State, na čelu z dr. Susan Cobey. Z njo so bili še prof. dr. Walter Sheppard, dr. Brandon Hopkins in Jackie Park-Burris, ena izmed večjih vzrejevalk matic v Kaliforniji. Dr. Susan Cobey je vodilna strokovnjakinja s področja umetne oprašitve čebeljih matic, zato smo skupaj s čebelarskim oddelkom Kmetijskega inštituta Slovenije (KIS) želeli čim bolj izkoristiti njen obisk in na neposreden način pridobiti čim več znanja in koristnih informacij. Po končanem obisku sem jo zaprosil, da zapiše vtise z obiska v Sloveniji, ki jih sedaj objavljamo. Ob tej priložnosti se zahvaljujem vsem, ki ste pomagali pri izvedbi obiska in pripravi prispevka.

Stanislav Plut

## Legendarne lastnosti kranjske čebele v njeni domovini

V veliko veselje mi je bilo obiskati domovino kranjske čebele in spoznati čebelarje s čebelarsko tradicijo, ki sega prav v petnajsto stoletje. Slovenski čebelarji so zelo ponosni na svojo domačo čebeljo podvrsto in jo vestno ščitijo s prepovedjo uvoza drugih podvrst. Videti je, kot da čebelnjak stoji pred vsako kmetijo ali hišo na podeželju. In vsak je okrašen s poslikanimi panjskimi končnicami, ki so značilne za slovensko čebelarstvo. Motivi panjskih končnic so res neverjetni, najdemo lahko tradicionalne in tudi bolj moderne.

Skrb za ohranjanje in razvoj kranjske čebele je navdušujoča. ČZS, Ministrstvo za kmetijstvo, gozdarstvo in prehrano RS ter KIS si s skupnimi močmi prizadevajo zagotavljati zdravo, rasno čisto in kakovostno populacijo. Podobne podpore si v ZDA ne moremo prestavljati.

Slovenski čebelarji so nas toplo pozdravili, nam odprli svoje čebelnjake in nas pogosto pogostili kar s požirkom domače medice. Ponudba njihovih čebelarskih izdelkov je izjemno raznolika. Od pijač do kozmetike, sveč iz čebeljega voska in seveda različnih vrst medu. Na vsaki lokalni tržnici tako lahko najdemo vsaj enega čebelarja z bogato ponudbo čebelarskih izdelkov.

Takoj smo opazili legendarne lastnosti kranjske čebele, kot sta mirnost in dobra prezimitev. Pri nabiranju trotov na satih zaščitne opreme največkrat sploh nismo potrebovali. Redko smo uporabili kadilnik ali pa le trak dimaka. Zaradi razgibanega reliefa, visokih gora in zahtevnega alpskega podnebja lepih slovenskih Alp se je kranjska čebela prilagodila na dolge zime. Ima hiter spomladanski razvoj,

Foto: Stanislav Plut

*Delovni dan se je začel na plemenilni postaji Rog-Ponikve, kjer smo nabrali trote.*

dobro izkorišča spomladansko pašo in med kratko pašno sezono nabere veliko medu za dolgo zimo. Prav te lastnosti so nas zanimale in prekrasne čebelje družine je bilo veselje pogledati.

## Osiromašena genetska pestrost čebel v ZDA

Nekrižanih čebel v ZDA skoraj ni. Italijanska in kranjska čebela sta med seboj zelo križani, saj izoliranih območij ne najdemo. Do prihoda Evropejcev medonosne čebele v Ameriki ni bilo. Prve čebele starega sveta so s seboj prinašali naseljenci iz Evrope tam od leta 1600 pa vse do leta 1922. Takrat pa je v ZDA v veljavo stopil čebelarski zakon, ki je zaradi pršičavosti prepovedal vsakršen uvoz čebel. Vsa čebelarska industrija se je zato razvila iz takratnih čebel.

Naše populacije so v tem času izgubile precej svoje genetske pestrosti. Eden izmed vzrokov sta intenzivno vzrejanje čebeljih matic iz relativno majhnega števila matičarjev ter propad divje živečih čebel zaradi varoj. Zelo perečo težavo predstavljajo tudi naključni tok genov, spremenjene frekvence genov in parjenje v ozkem sorodstvu.

Naraščajoča kmetijska pridelava v ZDA je zelo odvisna od tržnega opraševanja. Že samo kalifornijski nasadi mandljev zasedejo večino čebeljih družin, ki so pozno pozimi in na začetku pomladi v ZDA na razpolago. Kalifornija proizvede kar 80 % vseh svetovnih mandljev in čebele za njihovo opraševanje tja dovažajo iz prav vseh kotičkov države. Močna čebelarska industrija je za kmetijstvo bistvenega pomena, zato čebelarji in raziskovalci še naprej iščejo trajnostne rešitve za varno in učinkovito vzdrževanje čebeljega fonda. In prav vzdrževanje genetske pestrosti je ključnega pomena.

Prve družine kranjskih čebel so v ZDA prispele leta 1877. Zaradi nenadzorovanega parjenja in prepovedi uvoza je kranjsko sivko v Ameriki zelo težko vzrejati kot čistokrvno. Še največ uspeha pri tem ima skupina profesionalnih vzrejevalcev, ki vzdržuje linijo Kranjica novega sveta (New WorldCarnica, NWC), in sama sem vodja tega programa. Linijo smo zasnovali leta 1981 in brez vnosa novih genov jo vzdržujemo z uporabo umetnega osemenjevanja. Prvotne družine smo nakupili po vseh ZDA in Kanadi, nato pa smo s povratnim križanjem učvrstili tradicionalne lastnosti kranjske sivke, saj je bil uvoz svežih linij prepovedan.

## Sivke iz Slovenije osvežile linije kranjske čebele v ZDA

Svojo linijo NWC smo si že dlje časa želeli osvežiti z uvozom čiste vrste *Apis mellifera carnica* iz Evrope. Za to smo potrebovali uvozno dovoljenje, ki pa ga sprva nismo dobili. Tako kot v Evropi so tudi v ZDA številne čebelje družine propadle zaradi varoj. Zaradi tega se je zdravstveno stanje čebel poslabšalo, hkrati pa je povpraševanje po opraševanju še vedno skokovito naraščalo. Nekaj čebelarskih strokovnjakov, Steve Sheppard, Brandon Hopkins in moja malenkost, smo zato staknili glave in kmalu smo uspeli pridobiti dovoljenje za uvoz trotovega semena več čebeljih podvrst iz Evrope, prav z namenom osvežitve krvi in izboljšanja genetske pestrosti domačih čebel.

Sama sem se osredotočila na kranjsko čebelo. Leta 2011, potem ko sva pridobila vsa dovoljenja, sva s Hopkinsom s pomočjo in pod vodstvom dr. Aleša Gregorca pripotovala v Slovenijo in zbrala prve vzorce. Drugo zbiranje smo s Stevom Sheppardom in z dr. Gregorcem opravili leta 2017. Izredno smo hvaležni za vzorce, ki smo jih zbrali v petih čebelnjakih. Prve vzorce smo dobili na ČZS na Brdu pri Lukovici pri Mitji Nakrstu. V čebelnjak smo postavili mikroskop, polovili trote in odvzeli seme. Naša naslednja postaja je bila pri Stanetu Plutu iz Semiča na plemenilni postaji Rog-Ponikve. V Semiču smo se srečali tudi z domačimi čebelarji in jim pripravili kratko predavanje. Naslednje vzorce smo zbrali pri čebelarjih Juriju Gregorcu in Eriku Luznarju iz Begunj na Gorenjskem. Imeti dostop do takšnega genetskega materiala sredi tako čudovitih krajev je bilo resnič-

Foto: Stanislav Plut

*Pozorno smo spremljali postopek zbiranja semena in umetne osemenitve matice, kjer ni manjkalo vprašanj, in bogatejši smo za marsikatero izkušnjo.*

no doživetje, ki mu ni para. Nazadnje pa smo obiskali in odvzeli nekaj vzorcev še v čebelarstvu Braneta Kozinca iz Lesc. Kozinc vzdržuje in selekcionira linije, ki so bile zasnovane že davnega leta 1947. Mlade matice praši v odročni alpski dolinici, obkroženi z visokimi gorskimi vrhovi.

Izlet po Sloveniji je kar prehitro minil, mi pa smo imeli še eno veliko skrb – dragoceni tovor je bilo treba varno spraviti domov. Trotovo seme pri sobni temperaturi zdrži približno teden dni, zato smo imeli časa pravzaprav dovolj. Seme smo pred transportom seveda zamrznili v tekočem dušiku in ga tako shranili za daljše obdobje. Nekaj semena smo doma takoj vključili v linijo NWC in z njim osemenili nekaj mladih matic. Skladno s predpisi so morale nekaj dni preživeti v karanteni in prav ob nastajanju tega prispevka smo jih dodali novim družinam. Komaj čakamo, da bomo z njimi lahko začeli vzrejati. Kot matičarje jih bomo nastavili v vzrejni sezoni 2018 in njihove osemenjene hčere poslali našim vzrejevalcem, da bodo lahko z njimi vzrejali.

## Zahvala

Na koncu bi se radi toplo zahvalili Alešu Gregorcu za gostoljubje in organizacijo našega obiska, Stanetu Plutu za odojka in seveda vse kranjske trote. Posebej se zahvaljujemo tudi Mitji Nakrstu, Juriju Gregorcu, Eriku Luznarju in Branetu Kozincu, ki so nas spustili v svoje čebelnjake. Za vso podporo se zahvaljujemo tudi čebelarski skupini KIS. Res vsem hvala za prijaznost in hvala za ves trud, ki ga namenjate zaščiti kranjske čebele in ohranjanju čebelarstva v Sloveniji!

Dr. Susan Cobey
Prevod in priredba: Eva Cukjati in Peter Podgoršek

# Translation
# Impressions of Apis mellifera carnica in Slovenia
# Susan Cobey

*A team from Washington State University led by dr. Susan Cobey has visited Slovenia on 22nd of june with the assistance of dr. Aleš Gregorc. Among the team members were also prof. dr. Walter Sheppard, dr. Brandon Hopkins and Jackie Park-Burris who is one of the largest queen bee breeders in California. Susan Cobey is a leading expert in queen bee insemination, which is why we and Agricultural Institute of Slovenia wanted to make the most benefit of her knowledge and useful information during her visit to Slovenia. When the visit was over I asked dr. Cobey to write the impressions of her visit to Slovenia which are now being published in the text below. At this occasion I give thanks to all those who helped to organise the visit and to prepare this article.*

*Stanislav Plut*

To see Apis mellifera carnica in her motherland of Slovenia and to meet beekeepers with a long tradition and history of beekeeping dating back to the 1600's was a great pleasure. The pride and protection of this native subspecies is obvious among beekeepers throughout the country. The foresight in protecting carnica from the importation of other subspecies is commendable. Every farm and garden in the countryside seems to have a bee house. Decorated with folkloric paintings on the hive entrance panels, this feature is unique to the Slovenian traditional of beekeeping. The artwork is impressive, displaying both historic and modern motifs.

The support and devotion to the selection and maintenance of A.m.carnica in Slovenia is inspiring. The collaborative efforts ensure the health and certify the purity and quality of carnica stocks, supported by several organizations; the Beekeepers Association of Slovenia, the Ministry of Agriculture and Agriculture institute of Slovenia in Ljubljana. This kind of support for bee breeding is admirable and does not exist in the U.S.

With warm welcome, beekeepers shared their bee-houses, often with a sip of homemade honey liquor. Their shops offer an impressive diversity of products from the hive; liquors to cosmetics, beeswax candles, and of course a variety of honeys. Every small town seemed to have a farmer's market, full of fresh produce and always one or several beekeepers with lovely displays offering their hive products.

The reputation of Carniolans, their gentleness and good overwintering ability were apparent. Our bee veils were often left behind as we picked drones from the combs. Rarely a smoker in sight, just a lightly smoldering strip. Our goal was to collect germplasm (honey bee semen) to enhance the U.S. honey bee gene pool. The high mountains and harsh natural beauty of the Slovenian alpine requires bees adapted to survive long cold winters, build up fast to take advantage of the spring bloom and short season, store a plentiful crop and shut down for winter. These are the traits we are looking for. The elegance, beauty and consistency of Carniolan colonies throughout Slovenia was a joy to see.

In the U.S. it is difficult to find a "pure" subspecies, the Italian and Carniolan stocks are mixed due to the mating process and lack of isolated mating areas. The European honey bee is not native to North America. Honey bees were introduced through small subset samplings of Old World bees brought by European settlers between 1600 until 1922. The U.S. Honey Bee Act of 1922 restricted further importation to prevent the introduction of tracheal mites. From these initial importations, bees were propagated to establish the beekeeping industry in the United States.

Over time, the U.S. population has been subject to several genetic bottlenecks events. This includes commercial queen production based upon a relatively small number of breeder queen mothers, reducing genetic diversity. In addition, the feral populations, which contributed to a source of genetic variation in providing drones for mating with commercially produced queens, was largely eliminated by Varroa mite. Genetic drift, the changes in gene frequencies across generations due to chance or as the effect of inbreeding in small populations, also is of concern.

In the U.S. the increasing agricultural production is dependent on honey bee pollination and migratory beekeeping. Almond production in California alone requires the services of most of the managed colonies in the U.S. in late winter/early spring. Over 80% of the world's almond production occurs in California. Therefore, this need requires the transportation of colonies from across the U.S. to meet the demand. A healthy beekeeping industry is essential to agricultural production, as beekeepers and researchers continue to explore sustainable, safe and effective means to keep colonies thriving. A key component of this is maintaining genetic diversity.

The first Carniolans were introduced into the U.S. in 1877. These were difficult to maintain with the limited introductions and uncontrolled mating. The most successful effort to establish and maintain these is the selected strain of "New World Carniolan" maintained by Susan Cobey and a supporting group of commercial queen producers in California. Established in 1981, a closed population was established with the use of instrumental insemination and continues today. Initially, Carniolan stocks were collected from across the U.S. and Canada, and backcrossed to select traditional Carniolan characteristics, as importation was not an option.

To enhance and extend the longevity of the NWC program, the desire to import pure A.m.carnica stocks from Europe to enhance the breeding population was a dream. Obtaining the necessary importation permit was initially unsuccessful, until the need become more apparent. The challenges of beekeeping increased with the impact of Varroa mites, their associated pathogens and a concern of loss of genetic diversity coupled with the increasing demand for pollination services. Susan Cobey, Steve Sheppard, and Brandon Hopkins teamed up at Washington State University, obtained an importation permit for honey bee germplasm from the original homeland of several honey bee subspecies in Europe to diversity and enhance U.S. honey bee populations.

Cobey's focus was on A.m. carnica. Permits were obtained and in 2011, with the help and direction of Dr. Aleš Gregorc , Cobey and Hopkins travelled to Slovenia and made the initial carnica collection. In 2016, again with the guidance of Aleš Gregorc, a second trip was made along with Steve Sheppard. Collections were made from five apiaries of which we are very grateful and appreciative.

Our first collection was at the Beekeeping Center of Slovenia Center in Lukovica with Mitja Nakrst. We set up our microscope, collected drones and semen in the bee house. Intrigued, the bee house was equipped to accommodate an overnight guest in which the bees lived beneath the bed, providing a warm contented hum for a good night's sleep.

Our next collection site was with Stane Plut at his alpine mating station in Semič. The forest was blanketed with wildflowers, beautiful. In Semič we met with the local beekeepers and gave presentations about our program. Afterwards we celebrated with a feast of roasted pig, hosted by Stane. A fun event, attended by the queen of wine, and a major highlight.

We visited and collected at the bee house of Jurij Gregorc, in Begunje na Gorenjskem and Erik Luznar in Begunje na Gorenjskem. Seeing the beauty of the countryside, the various stocks of carnica and having access to these sources was very exciting. The final apiary visit for collection was with Brane Kozinc of Lesce. Brane continues the tradition of selecting and maintaining his stock, established in 1947, in the isolated mating station in the high elevation valley surrounded by mountain peaks. His great grandfather was one of the original founders of the first beekeeping association established in 1781.

A free day before returning, we explored the underground canyons of the Škocjan Caves. Breathtaking, few words can describe this national treasure, and well worth the sore legs. The trip passed too quick, and there was still work - to get the precious cargo safely back to the beekeepers.

Honey bee semen can be held fresh at room temperature for about a week, so this is enough time for successful transport back to the U.S. Bee semen was also cryo-preserved, frozen in liquid nitrogen, for future use. The genetic material collected has been incorporated into the New World Carniolan breeding program. NWC virgin queens were instrumentally inseminated with the Slovenian carnica semen. These queens were established and held in a quarantine according to the permit regulations. Upon release approval by the USDA, we are excited to see the results this season. The queens inseminated to semen from the Slovenian carnica stocks will be propagated, inseminated and provided to cooperating queen producers.

A special thanks to Aleš Gregorc for hosting us and organizing our visit and
to Stane Plut for the pig roast, and for the carnica drones. A special thanks also to Mitja Nakrst, Jurij Gregorc, Erik Luznar and Brane Kozinc for sharing their apiaries and access to their stocks. And thanks to the bee group at the Agriculture institute of Slovenia in Ljubljana for their support. We are very appreciative and grateful. Thank you all for your friendship and for protecting and continuing the Slovenian tradition of Carnica Beekeeping!!