Nordic-Baltic Bee Council & Nordic-Baltic Apicultural Research Symposium

ABSTRACTS

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HONEY BEES' BODY CHEMISTRY IS INFLUENCED BY BOTH THEIR AGE AND THE HISTORY OF THEIR COLONY

Karise, R., Raimets, R., Naudi, S., Jürison M., Pent, K., Liiskmann, E., Tõnutare, T., Mänd, M.

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Scientists are increasingly interested in studying the elemental content of insect bodies because it's a quick and affordable way to assess environmental pollution and changes in biological systems. This field is relatively new in entomology, so there's still a lot to learn. To understand changes in the elemental content of honey bees, we need to know their natural state first.

In our study, we looked at how the elemental content of honey bees changes as they prepare for winter. We compared nurse and forager bees from regular hives used for honey production and newly established smaller colonies, sampled in September and October. We found that the type of hive and the role of the bees affected their elemental content in September, but not in October. Even though both hive types were given sugar syrup for winter, the new colonies likely had less stored pollen and honey from earlier months and relied more on the syrup in September.

Our findings suggest that the history of the colony and the role of the bees can cause variations in their elemental content. This should be considered when planning environmental studies or nutritional experiments with honey bees.

ESTABLISHMENT OF MOLECULAR METHODS FOR MONITORING HONEYBEE PATHOGENS IN NORWAY

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Due to their way of life, honeybees (*Apis mellifera*) are particularly sensitive to changes in the environment. Climate change and changes in land use likely lead to increased disease and parasite pressure. High winter losses of bee colonies are a consequence that has become a costly problem for the industry. In order to detect and react to pathogen infections and outbreaks, establishment and optimization of diagnostic methods for different bee pathogens is of value.

We implemented quantitative molecular methods (qPCR) to detect six pathogens (*Nosema/Vairimorpha apis, Nosema/Vairimorpha ceranae, Ascosphaera apis, Lotmaria passim, Crithidia mellificae, Acarapis woodi*) on different relevant matrices (honey, hive debris and adult bees).

We used the established methods to screen a selection of samples collected from interested beekeepers in Norway. Roughly 40 samples of each of the sample types were collected between June and October 2023. Two of the pathogens (*A. woodi* and *C. mellificae*) were not detected in any of the samples. *L. passim* was found only in honey and bee samples. The other three pathogens were found in all sample types.

RECENT STUDIES ON BEE SPECIES COMMUNITIES IN VARIOUS AGRICULTURAL BIOTOPES IN LATVIA

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Research on wild bees (Hymenoptera: Anthophila) has been sporadic in Latvia over time, as the insect group has generally not been popular among entomologists. The last scientific publications on them date back to the 1990s. After that, there was a break of more than twenty years until 2019, when the Institute 'Agrihorts' was invited to participate in the international project CliPS ("Climate change and its effect on Pollination Services"), which studied bee species communities in flowering apple orchards.

The CliPS study lasted one growing season, but from 2020, broader studies of bee species communities in various agrocenoses were launched. This was done both in flowering apple orchards and in areas of other crops flowering in June and July in two relatively different regions of Latvia: Zemgale and Vidzeme. Zemgale has the most fertile soils in the country, so various agricultural biotopes dominate the landscape. In Vidzeme, however, the total proportion of forests, wetlands and other natural and semi-natural biotopes is significantly higher than that of agricultural ones. Since 2021, bee studies have also been conducted in grasslands in the same regions of Latvia.

In the apple orchards, we have observed 92 bee species: 30 Andrenidae, 26 Apidae, 31 Halictidae and 5 Megachilidae species. The mining bee *Andrena haemorrhoa* (21.45%) and the European honeybee (*Apis mellifera*) (18.79%) were the most common species. In total, various mining bees (Andrenidae) made up almost half (48.00%) of the apple orchard bee species community. In June-flowering agrocenoses – mostly in faba bean (*Vicia faba*) and spring rapeseed (*Brassica napus*) crops – 101 bee species were observed: 18 Andrenidae, 28 Apidae, 10 Colletidae, 28 Halictidae, 15 Megachilidae and 2 species of the Melittidae family. The most common was the honeybee (48.59%). Another 12 species had a proportion exceeding 1% but not exceeding 8%. Among them were two species of mining bees (*Andrena*), three bumblebees (*Bombus*) and seven species of sweat bees (*Halictus, Lasioglossum*). In July, 111 bee species were observed in flowering agrocenoses – mostly in buckwheat (*Fagopyrum esculentum*) and red clover (*Trifolium pratense*) fields. These included 20 Andrenidae, 32 Apidae, 9 Colletidae, 29 Halictidae, 16 Megachilidae and 5 Melittidae species. The proportion of the honeybee (53.43%) was even higher than in agrocenoses flowering in June. Another 12 wild bee species had a proportion of individuals in the range of 1–8%, while for the other species, it did not reach 1%.

The communities of grassland bee species were studied in the Protected Landscape Area "Ziemeļgauja" in Vidzeme. In Zemgale, these studies were carried out on Jelgava's Pils Sala Island (nature reserve "Lielupes palienes pļavas") and in one grassland on the right bank of the Lielupe River outside the protected areas. All the grasslands studied were managed in biodiversity-friendly manner (late mowing or grazing). The communities of bee species in these places have not yet been analysed in detail. However, a rough look at the obtained data shows that bee species communities are significantly richer and more diverse in Vidzeme grasslands. There are several explanations for this. Vidzeme

grasslands have significantly more diverse vegetation. In addition, these grasslands border biologically diverse forest, river and oxbow lake biotopes. In contrast, the Zemgale grasslands are in an urban environment, their plant species communities are less diverse, and their immediate surroundings do not form a mosaic of biologically diverse biotopes. In addition, most of Pils Sala Island is flooded in the spring, so there are significantly limited nesting resources for the bees.

Our research was funded by the Ministry of Agriculture, Republic of Latvia, project "Evaluation and determination of the most effective control methods of topical pests of the pulses and identification of the factors affecting the viability of the most important pollinators for agriculture".

HONEYBEE VIRUSES IN LITHUANIA

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Over several decades, honeybee colonies have been declining in different parts of the world, with negative consequences for honey production, crop pollination and food production. Although these losses are caused by a variety of interacting abiotic and biotic factors, it is recognised that viruses are important for the health of honeybee colonies. More than 50 honeybee viruses have now been identified worldwide. Among the most important are deformed wing virus (DWV), sacbrood virus (SBV), black queen cell virus (BQCV), acute bee paralysis virus (ABPV), Israeli acute paralysis virus (IAPV) and Kashmir bee virus (KBV). In the Baltic countries, including Lithuania, limited information has been available on the presence and distribution of honeybee viruses. However, since 2007, Lithuanian beekeepers have reported increased winter losses of honeybee colonies, which we hypothesised could be related to viral infections.

Virus surveys using molecular methods in the Lithuanian honeybee population started in 2012. Six honeybee viruses were studied: ABPV, IAPV, KBV, DWV, SBV and BQCV. The three-year study (2012-2014) revealed a dramatic increase in the number of colonies infected with the viruses, from 66.2% in 2012 to 90.6% in 2014. BQCV and SBV were the most prevalent viruses. DWV prevalence was lower than in other European countries and KBV was detected in only a single colony, while ABPV and IAPV were not detected. Phylogenetic analysis revealed that the partial polyprotein gene sequences of the viruses detected in Lithuanian honeybee colonies were closely related to the viruses reported in European countries.

As it was found that there are still colonies of dark honeybees (*Apis mellifera mellifera*) in Lithuania, a study was planned to compare the infection of honeybee colonies of the native subspecies (M lineage) and the introduced subspecies (C lineage) with four viruses - BQCV, SBV, DWV and ABPV. After testing 60 colonies, viruses were found in 95% of the colonies. No statistically significant differences were found between the viral infection rates of colonies from different M and C lineages.

INSIGNIA-EU. A PAN-EU BIO-MONITORING CITIZEN SCIENTIST STUDY OF POLLUTANTS IN THE ENVIRONMENT WITH HONEYBEE COLONIES; UNDERLYING MECHANISMS AND 2023 RESULTS

J. van der Steen

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The underlying mechanisms

Honeybees collect all particles during food collection. They accumulate these particles in the hive. Each bee carries a not measurable number of pollutants but in the hive, this is accumulated into measurable amounts. The honeybee is the sampler, and the beekeepers collect this information from the hive. In the INSIGNIA study, this was done without killing bees or bee's brood but with in-hive passive samplers. Next, there is a constant airflow in the hive initiated by the bee colony. In this way, besides particles gaseous pollutants were monitored. We applied the APIStrip to collect non- and semi-polar pesticides, APITraps for microplastics, silicone bands for air gaseous air pollutants, propolis for heavy metals, and freshly collected honey for a selection of polar pesticides. Next to the contaminants we collected every 2 weeks the pollen for one day with the pollen trap to evaluate the pollen diversity in the EU.

INSIGNIA-EU is the first pan-European action that has provided the baselines for the use of honeybees as environmental monitoring tools. In this citizen scientist beekeeper project, performed in 2023, honeybee colonies were used to biomonitor environmental pollution in 315 apiaries in the 27 EU countries.

The 2023 results

Non-polar pesticides were monitored with APIStrips every two weeks; 202 compounds were detected in the 5,524 APIStrips. Azoxystrobin, boscalid, and acetamiprid were the most detected pesticides. The median number per APIStrip was four in agricultural-, two in urban- and two in natural areas. Honey was sampled at four-week intervals, giving 1,164 samples. Polar pesticides found in honey were glyphosate, AMPA, phosphonic acid, or N-acetyl-glyphosate. Microplastics were sampled at four-week intervals; 52,099 synthetic polymer fibers and 7,244 synthetic polymer fragments and films were detected and analysed. Polyester, polypropylene, and polyacrylonite were the most detected microplastics. Metals were sampled at four-week intervals, and greater amounts of metals were found in southern Europe, due to natural soil sources. The analysis detected point emission sources. After four weeks of in-hive exposure for 1,216 silicone bands, all 20 target VOCs were detected. Isoprene was followed by hexane and benzene. Of 35 target PAH compounds, 34 were detected, the dominant compounds being naphthalene, methylnaphthalenes, and pyrene. Significant exceedance of the average values indicated locally increased emissions. The 2,490 bee-collected pollen samples showed 501 genera. Pollen of *Trifolium*, *Plantago*, *Brassica*, *Rubus*, and *Castanea* was most abundant. Pollen diversity was higher in urban and natural- than in agricultural areas. The Mediterranean area has the most differentiated bee-collected pollen in Europe. Pollen diversity and the distribution of environmental pollution in the European Union throughout the bee season are visualized in spatially explicit models. The study has already generated eight scientific publications. INSIGNIA-EU is an EU-funded project (Nº 09.200200/2021.864096/SER/ENV.D.2.”.).

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TIMING OF PROPOLIS PRODUCTION

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Beekeeping business is not dependent only on production of honey. The profit of business can be enhanced by help of side products like propolis. Propolis has stable marketing possibilities both domestically and export offers good trade as well. However, propolis production is little studied in northern climate. New commercial propolis grids are available for beekeepers. Meantime little is known which grid offers the highest harvesting possibility and how choice of grid affects quality of the product - raw propolis. Also timing of propolis production is an important issue. For example, how choice of production time affects biological activity of the raw propolis? Which is the most effective production time during the summer? These are question we addressed to the field study which was caried out in Latvia in summer 2024.

In the East, mid and West Latvia three study sites were established in summer 2024. In each study site ten colonies were equipped with four different commercial equal size propolis grids – i) thin plastic Austrian grid (mesh size 1.5x1.5mm), ii) silicon type German grid (mesh size 2.5x3.5mm), iii) Polish Lyson plastic grid (mesh size 2.0x19.0mm) and iv) Greek Annel plastic grid (mesh size 2.0x20.0mm). Study started on 18th of June. Sampling was caried out after every three weeks (old grids were replaced by new ones) as a result study had in a total four sampling rounds. Grids were extracted in the lab of Latvian Beekeepers association and samples were shipped to Germany to lab of QSI. In the lab the following parameters were analysed: wax content in the raw material, concentration of flavonoids, Heavy metals (Fe, Zn, Cd, Hg, Pb) and pesticide residues.

Results of our study showed that the silicon type of grid (country of origin - Germany) was the most effective. It offered the highest yield per production season. Lyson and Annel type of grids were less effective compared to others. All propolis samples contained Fe, Zn, and Pb but none of samples contained Hg and Cd. All propolis samples were free of pesticide residues independent of sampling round. Flavonoid concentration depends on production time. In the first part of summer flavonoid concentration was low. However, it had tendency to grow during the season and the highest peak of flavonoids in propolis was reached in the end of season. In the first sampling round we observed by average the highest wax concentration in propolis and the lowest concentration in the second sampling round, respectively 44% and 28%. Still wax concentration in our study was too high and, in many cases, overrun threshold 25%.

STATISTICS ABOUT THE SWEDISH WINTER LOSSES 2023-2024

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Swedish Agricultural Board

The monitoring of colony winter losses is carried out using the COLOSS questionnaire survey. The purpose of monitoring is to gather, investigate and share data on honeybee colony losses across different regions and countries. Sweden has been attending COLOSS since 2008 when it officially started. The frequency of questionnaire responses from beekeepers has been several years above 3000. The colony losses in Sweden have varied between 9,6% and 24,7%, and last winter (2023-2024) we experienced a significant higher mortality, 18,6%. Those beekeeper with less than 5 colonies had in average the highest losses. The most frequent cause of losses were dead bees in the hive or empty hive (69%), dead queen or unsolvable queen problem (19%), whereas the rest, 12%, was due to some natural disasters (windy weather, fallen trees, snow or flooding). The most frequent methods for controlling varroa last year were oxalic acid trickling followed by drone brood removal. The veterinary medicine, Apivar (amitraz), with polymer strips are still sparsely used in Sweden. Significant lower winter losses were obtained when using oxalic acid treatment (trickling & fumigation) and drone brood removal compared with no treatment.

TRUSTABLE AND SUSTAINABLE OPEN PLATFORM FOR SMART HONEY VALUE CHAINS

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The honey business as an agri-food sector faces sustainability challenges to cope with complex relations from farm to fork, climate change, increasing competitive pressures, varying consumer diets, and food safety. The TOP4HoneyChains is a collaborative project funded within the ICT-Agri 2022 call. Within the project challenge to generate a smart value chain, driven by market preferences and consumer demands, based on the quality that has been preserved from the apiary, with records and transparency throughout the entire honey-food business including the apiary and honey processing, building trust between buyers and sellers, will be tackled.

TOP4HoneyChains project presents an innovative approach to address the challenges faced by the honey industry regarding transparency, trust, and sustainability. The primary concern of TOP4HoneyChains is to increase effectiveness and efficiency of traceability and transparency for achieving smart honey value chains as a whole honey-food system supported by a trustable open data platform along data-driven innovative digital services.

Services will provide the users with feed-forward (from the apiary) as well as feed-back mechanisms along well-documented and verifiable information regarding the apiary, the origin and production practices, quality metrics, and “the story of honey” as higher value-end products.

In addition to organizational and social tasks, TOP4HoneyChains project addresses several technical challenges related to the implementation of the open data platform. Establishing generally accepted “source of truth” about honey products is not a trivial undertaking, more so designing it for distributed and secure operation. Modelling is applied for various aspects of the data platform, including analysis of rationale and behaviour of malicious actors.

More information about the project can be found on the website: https://top4honeychains.eu/

VARROA SITUATION ON ÅLAND 2024

Marcela Suchá, Matej Suchý

Åland Beekeepers Association

Although Åland remains varroa free the situation is much more complicated. The presentation of the report describes the main findings of the projects done during the past 3 years and plans for future projects. Yearly taking of samples led to identifying some infected hives in archipelago and that led to eradication program financed by local government. More and more samples, virgin queens project, sentinel hives on Brändö in sufficient amount but in awareness on fragile environment in archipelago. The report provides insight into complications and coincidences and how easy it is to destroy such a unique place for beekeeping.
And yet, despite it all we stand and fight on.

ENHANCING PRECISION BEEKEEPING BY THE GEOGRAPHIC INFORMATION SYSTEM SOLUTIONS

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Beekeeping is an important branch of agriculture that extends beyond the production of honey and hive products to play a crucial role in pollination, biodiversity, and maintaining ecological balance [1]. Modern realities present various challenges in beekeeping that impact not only specific activities but also the development of beekeeping as a branch of agriculture. These challenges, driven by environmental, economic, and societal factors, demand innovative and adaptive solutions to ensure the sustainability of apiculture and the health of pollinator populations [2].

Advancements in technology have significantly influenced beekeeping, transforming it into a more efficient and precise practice known as precision beekeeping. This approach leverages ICT tools to collect data through various IoT solutions and systems, providing detailed information about individual bee colonies and apiaries on a local scale [3]. At the same time, it is crucial to consider the surrounding environment and conditions, particularly when assessing the suitability of nearby areas. Since the flight radius of honeybees extends several kilometers, it is essential to support beekeepers' decision-making on a larger scale [4].

One way to improve bee colony management is through the implementation of geographic information system (GIS) solutions in conjunction with local-scale ICT approaches. Such a solution could provide beekeepers with a valuable set of tools to plan their activities and monitor bee colonies in real time, with a spatial perspective. Additionally, this approach could foster collaboration between beekeepers and other farmers in surrounding agricultural lands, ultimately enhancing agricultural practices as a whole. This study explores potential ways to leverage the capabilities of geographic information systems (GIS) to address current challenges in precision beekeeping. As part of the research, an experimental prototype of a multi-module GIS-based solution is being developed, aimed at integrating various GIS and IoT approaches. The aim of this solution is to support beekeepers in decision-making while fostering a symbiotic relationship between beekeeping and other branches of agriculture.

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HONEY DNA METAGENOMIC ANALYSIS TO IDENTIFY HONEY COMPOSITION AND MONITOR HONEY BEE PATHOGENS

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Honey's DNA mixture originates from various organismal groups like plants, arthropods, fungi, bacteria, and viruses. Conventional methods like melissopalynological analysis and targeted honey DNA metabarcoding offer a limited view of honey's biological composition. We conducted a honey bulk DNA metagenomic analysis to characterize the honey's taxonomic composition and identify honey bee related pathogens and parasites based on 266 Estonian and 103 foreign honey samples. 70.4% of the DNA in Estonian honey was derived from green plant families like Brassicaceae, Rosaceae, Fabaceae, and Pinaceae. Geographical distribution analysis revealed distinct botanical compositions between Estonian mainland and island samples. The bacterial family Lactobacillaceae was prevalent overall, reflecting the honey bee microbiota in honey. We detected 12 honey bee pathogens and parasites, including Paenibacillus larvae and Nosema ceranae. In conclusion, the study underscores the potential of bulk DNA-based and non-targeted metagenomic approaches for monitoring honey bee health, environmental quality, and honey composition, origin, and authenticity.

Keywords
Honey DNA, DNA metagenomic analysis, Estonian honey, Honey authenticity, Honeybee pathogens, Honeybee pests

Funding
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POLLINATION OF HONEYBEES AS A PART OF SECURITY OF SUPPLY

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Finnish Beekeepers' Association

In the times of emergency and crisis, ensuring the availability of food is the most important factor besides energy supply. When a major part of food and fodder in the world depends on bee pollination, securing pollination may become a key factor in preparing for exceptional and surprising circumstances.

The crop increase from bee pollination hasn't been fully studied in the variable conditions of Finland, and there is no plan about securing pollination in cases of exceptional situations. By investigating the benefits of pollination services and developing them to correspond modern crops and strains, Finnish food and fodder production may be secured also in exceptional circumstances.

The new project of Natural Resources Institute Finland and Finnish Beekeepers' Association aims to develop a new national model of operation where the present state of pollination services, the points of development, and its use in emergency and crisis situations will be described. The project will also aim to create a national pollination network, through which farmers and beekeepers can find each other more easily and find possibilities for collaboration to enhance food security and yields. These objectives will aid in integrating pollination services as a part of security of supply.

BEEPLANTS.EU, A CITIZEN SCIENCE STUDY ABOUT FOOD SHARING AMONG POLLINATING INSECTS; STUDY SETUP AND PRELIMINARY 2024 RESULTS

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To address, as far as possible, concerns about the carrying capacity of regions to feed the honeybees, bumblebees, solitary bees, hoverflies, and all other insects that depend on flowers, the beeplants.eu study is being conducted. These concerns arise because of the increasing use of space by infrastructure, the intensification of agriculture, and the loss of biodiversity. A way to answer these questions is to conduct a baseline measurement, to determine if this changes in time. In the EU BetterB study, we address this with the beekeeper citizen science study with the app ”beeplants.eu”. This app is based on the Danish beekeeper’s association app “beeplanter.dk”. Here the participants record honeybees, bumblebees, solitary bees, hoverflies, and other insects in the flowers listed in the app. We ask them to make minimally two times a week recording of the same flowers and locations in the proximity of their house or work to rule out the impact of e.g. different soil conditions and land-uses. We started the study in 2024 with 225 participants in Finland, Latvia, Norway, Denmark, the Netherlands, Belgium, and France and analysed the recordings from January 2024 till the end of September 2024. The disclaimer before showing results is that the plant species mentioned do not fully represent the bee plants but show the bee plants in the proximity of the participants. We had 7544 overall observations on 113 plant species. Per observation, of these plants, 45% of the recording had 1 pollinating insect, 23% had two insects, 10% had four insects, 1% had five insects and 16% had no insects. The database was cleaned up to perform data analyses. This resulted in 5698 observations of 74 plant species. The following results are based on this data set. We noticed that none of the 74 plant species was visited by only one insect during the observations. All insects shared these food sources in different combinations. The data were analysed for the relative presence of specific flowers in winter, spring, and summer, the impact of temperature, and combinations of insects per observation. In the 74 plant species, 42% had per observation one pollinating insect and 58% had multiple pollinators visiting. In winter the majority of the honeybees were recorded on *Crocus* spp. and bumblebees and solitary bees on Salix spp. In spring the honeybees were found mostly on *Acer pseudoplantanus*, bumblebees, and solitary on *Geranium* spp. solitary bees on *Phacelia tanacetifolium*. In summer the majority of the honeybees were recorded on *Lavendula angustofolia*, the bumblebees on *Tilia* spp., and the solitary bees and hoverflies on *Heracleum* spp. In the temperature range of 2 to 9 °C, the honeybees were mostly recorded on *Acer campestre* and the bumblebees on *Taraxacum* spp. In the range of 9 to 16 °C. the honeybees were recorded the most on *Prunus domestica* and the hoverflies on *Heracleum*, In the range of 16 – 23 °C the honeybees and bumblebees preferred *Lavendula angustifolia* and hoverflies *Heracleum*. Overall, the honey bees were mainly found on *Acer campestre*, followed by *Lavendula angustifolia* and *Origanum vulgare*, and the bumblebees in *Tilia* spp. The solitary bees were recorded on a wide variety and did not show any preference, and the hoverflies were mainly recorded on *Heracleum* spp. The majority of the plants were mainly visited by the honeybee except *Anemone tomentosa*, *Crepis,* and 5 others by hoverflies. The bumblebees were mainly found on *Echium* and 12 other plant species. The study will be

continued in 2025 and 2026 and beekeepers from minimally Spain, Portugal, Italy, Greece, Cyprus, Poland, and Germany will be asked to join.

Learn more
www.better-b.eu

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Better-B Project

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ÅLAND HONEY - PROTECTED DESIGNATION OF ORIGIN

Marit Wiklöv

Åland Beekeepers Association

Three European Union schemes of geographical indications and traditional specialties, known as protected designation of origin (PDO), protected geographical indication (PGI), and traditional speciality guaranteed (TSG), promote and protect names of agricultural products and foodstuffs, wines and spirits. Products registered under one of the three schemes may be marked with the logo for that scheme to help identify those products. Åland honey meets the requirement of geographical region which is clearly separated and moreover the specificity is described with dozens of parameters.

THE HEALTHY BEES INITIATIVE

Richard Johansson

Swedish Beekeepers Association

Bee health is and has long been a priority area for the beekeepers in Sweden and their organizations. For several years, the Beekeeping Collaboration Council has identified important areas for Swedish beekeeping where joint measures can be taken. Bee health has been a clear example of such an area with urgent needs. In the Beekeepers' member survey, bee health also comes out on top of topics that members want to learn more about and that they consider to be the highest priority. During the project year, we have established a new bee health platform that can work as a gathering place for the Swedish joint bee health work.

Through the site, evidence-based knowledge and verified advice in bee health are conveyed and all beekeepers can be offered access to a complete bee health education with a new study book in bee health and accompanying syllabus. Another important task for the project is the development of self-monitoring programs and instructions for disease control. Material will be published continuously and serve as a hub for beekeepers seeking further knowledge. The project has also carried out planned field trials and organized training days for beekeepers on different levels.

A network has been formed under the name “Nätverket friskabin” (Healthy Bees Network) which consists of the national advisors at the Swedish Beekeepers Association and the Swedish Board of Agriculture, the Bee Health Coordinators in all of Sweden’s 25 beekeeper districts, the Regional Bee Health Advisors, representatives from the Professionals Beekeepers and The Swedish University of Agricultural Sciences. The network also leads the work of the newly established Vespa Velutina Emergency Response Group.

I will speak about the project and its initiative to enhance bee health and beekeepers’ knowledge in bee diseases and effective disease prevention.