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Beekeeping together within agriculture



Canadian Honey Council



ABSTRACTBOOK

a city. We have investigated lead (Pb) source apportionment in Metro Vancouver using honey, bee bread, and bees collected from urban apiaries in six local neighbourhoods. The results show that trace element concentrations and Pb isotopic compositions of these samples from various parts of Metro Vancouver differ systematically due to their proximity to anthropogenic metal sources related to land use, such as shipping ports and heavy traffic. Similar analyses on more traditional environmental proxies (topsoil and air particulates) have helped establish efficacy for our use of hive products as urban biomonitors. This study demonstrates the value of interdisciplinary collaboration when addressing issues related to environmental monitoring, urban ecology, and public health. Importantly, this work has benefited from partnerships with the general community and organizations including Hives for Humanity (non-profit, urban beekeepers with an extensive network of 'citizen' apiarists) and Metro Vancouver (official federation of twenty-one municipalities within Vancouver's metro region). This model provides compelling support for a citizen science approach where community members volunteer samples of their own backyard or rooftop apiary products to assess environmental conditions in addition to satisfying their own scientific curiosity. The results of this study provide a comprehensive baseline of trace element and Pb isotopic compositions in hive products, against which future results can be compared as population, land use, and regulatory policy change over the next century in Vancouver, BC.

Introducing the INSIGNIA project: Environmental monitoring of pesticides use through honey bees

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INSIGNIA aims to design and test an innovative, non-invasive, scientifically proven citizen science environmental monitoring protocol for the detection of pesticides via honey bees. It is a pilot project initiated and financed by the European Commission (PP-1-1-2018; EC SANTE). The study is being carried out by a consortium of specialists in honey bees, apiculture, chemistry, molecular biology, statistics, analytics, modelling, extension, social science and citizen science from twelve countries. Honey bee colonies are excellent bio-samplers of biological material such as nectar, pollen and plant pathogens, as well as non-biological material such as pesticides or airborne contamination. Honey bee colonies forage over a circle of about 1 km radius, increasing to several km if required depending on the availability and attractiveness of food. All material collected is concentrated in the hive, and the honey bee colony can provide four main matrices for environmental monitoring: bees, honey, pollen and wax. For pesticides, pollen and wax are the focal matrices. Pollen collected in pollen traps will be sampled every two weeks to record foraging conditions. During the season, most of the pollen is consumed within days, so bee bread can provide recent, random sampling results. On the other hand wax acts as a passive sampler, building up an archive of pesticides that have entered the hive. Alternative in-hive passive samplers will be tested to replicate wax as a "pesticide-sponge". Samples will be analysed for the presence of pesticides and the botanical origin of the pollen using an ITS2 DNA metabarcoding approach. Data on pollen and pesticides will be then be combined to obtain information on foraging conditions and pesticide use, together with evaluation of the CORINE database for land use and pesticide legislation to model the exposure risks to honey bees and wild bees. All monitoring steps from sampling through to analysis will be studied and tested in four countries in year 1, and the best practices will then be ring-tested in nine countries in year 2. Information about the course of the project and its results and publications will be available on the INSIGNIA website www.insignia-bee.eu.

Engaging bee-stakeholders for a bee-friendly Kyoto: A transdisciplinary research process

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The importance of honeybees and their direct and indirect services to human well-being earned lately increasing attention by media, policy-makers and researchers around the world. While a lot of that attention goes to the western *A. mellifera* and has a natural science angle to it, this presents a serious obstacle to improving the situation in the Japanese context of the world leading aging-society where a shift is happening: Professional *A. mellifera* beekeepers are retiring and declining, while retirees turn increasingly to *A. cerana* beekeeping as a hobby.

To grasp the challenges and potentials for beekeeping originating from the societal changes in Japan we chose a trans-disciplinary (TD) research process as method around the themes "A Future with Bees" and "Let's create a Bee-friendly City". This allowed not only beekeepers with diverse backgrounds, but also citizens and civil society groups to engage as bee-stakeholders. Furthermore the TD process shined a light onto the under-represented and under-studied humanities and social science aspects of honeybees and beekeeping while still integrating the natural science base, as well as focused on the lesser regarded eastern *A. cerana*.