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Final Conference

INSIGNIA

Preparatory Action for monitoring of environmental pollution using honey bees

HIGH-LEVEL SEGMENT
(EUROPEAN PARLIAMENT)
5 December 2024 10:00-12:00

Online attendance only:
https://europeanparliament.webex.com/europeanparliament/j.php?MTID=m823087403d18c1eaf9862abb479435de

CONFERENCE
(EUROPEAN COMMISSION)
5 December 2024 13:30-18:00
Charlemagne building, Room Lord Jenkins
Rue de la Loi 170, 1040 Bruxelles, Belgium

Webstreaming:
https://webcast.ec.europa.eu/insignia-meeting

BACKGROUND

INSIGNIA Preparatory Action

The aim of the INSIGNIA action was to establish a citizen scientist pan-EU network of beekeepers, to bio-monitor environmental pollution using honey bee colonies. To achieve this, the INSIGNIA action 1) built a beekeepers citizen scientist community, 2) developed in-hive passive samplers (APIStrip, APITrap and silicon bands) to conduct the non-invasive sampling of honey bee colonies, and 3) provided proof of principle that a honey bee colony is an excellent, globally applicable, reliable bio-monitoring tool.

The action was carried out in 315 INSIGNIA apiaries across all 27 EU countries. In each country, a national coordinator was assigned with a direct link to the participating beekeepers and the INSIGNIA consortium. A national coordinator distributed the sampling toolkit to beekeepers, organised the transport of the samples to laboratories as well as the dissemination of the results. Sampling was facilitated by an illustrated manual that described in detail the steps for sampling (when, what, and how), storage and shipment. The apiary selection was based on land use: agricultural, artificial, and forest/natural plus the degree of diversity of land uses within these categories. Following pilot studies in nine countries in 2022, the pan-EU sampling was undertaken in 2023 and comprised nine sampling rounds from April to August. The sampling was undertaken simultaneously in all 315 apiaries using the same methods, resulting in data that are directly comparable. Pollen samples were also taken with a view to establish the diversity of forage available to honey bees in the surveyed landscapes.

Out of 450 non-polar target pesticides, 202 pesticides were detected with the 5 524 in-hive passive sampler APIStrip. No apiary was completely free of pesticides, indicating that pesticides are ubiquitously present in the environment. The fungicides azoxystrobin, boscalid and fluopyram and the insecticide acetamiprid were found in almost each apiary. The median number of pesticides per APIStrip was four in agricultural areas, two in artificial areas, and two in the forest and natural areas. Eight polar pesticides were analysed in fresh honey. In 6% of the samples, glyphosate and its derivates were dominating.

With the in-hive passive sampler APITrap, about 60 000 particles of microplastics were identified. Most of them were fibres, followed by fragments and films. The most abundant microplastic material found came from polyester, polypropylene, and polyacrylonitrile. The number of microplastic particles was similar between the three land use types.

With regard to air pollutants, in silicon in-hive passive samplers were analysed for a selection of 35 polyaromatic hydrocarbons and 19 volatile organic compounds. All the compounds were found and point sources could be localised. The most commonly detected volatile organic compounds were isoprene and hexane, and the most commonly detected polyaromatic hydrocarbons naphthalene and methylnaphthalenes.

Propolis was analysed for eight heavy metals and all of them were found (point sources could be localised).

The analysis of around 2 500 pollen samples showed pollen of 501 plant genera. The most abundant genera were *Trifolium*, *Plantago*, *Brassica*, *Rubus*, and *Castanea (Brassica* in the northern and *Plantago* in the central and eastern European sampling sites). The mean diversity of the pollen collected by honey bees was higher in artificial than in agricultural and forest/natural land-use types (mean number of genera = 9.5, 8.5 and 8 respectively). The samples from the Mediterranean countries had the most differentiated pollen.

The results of the analysis were used in spatially explicit (predictive) models to visualise the distribution of pesticides and heavy metals as well as the pollen diversity, for each country and the European Union as a whole. The number of plant genera visited by honey bees increased as the vegetation season progressed, especially in central Europe. EU-wide, the number of detected pesticides increased during spring/early summer, indicating linkage with agricultural practice. The predictive mapping of heavy metals reflected to a large extent the natural background levels in topsoil.

For more information:
INSIGNIA website
EU Pollinator Information Hive

For questions and queries:
Mr Jozef van der Steen, Alveus AB Consultancy, alveusab@outlook.com

REGISTRATION

If you wish to attend the conference in person, please register by sending an email to Ms Ilona van den Berg ilona.vandenberg@wur.nl ***by 25 November at the latest****, indicating your name, email address and affiliation.*

No registration is required for following the conference online via webstreaming. Webstreaming details will be published at www.insignia-bee.eu at later stage.

PROGRAMME

High-level segment (European Parliament)

10:00-12:00

Conference (European Commission)

13:30-13:40 Welcome

European Commission (*tbc*)

Jozef van der Steen, INSIGNIA coordinator

13:40-15:00 Presentation of the project results

Introduction by Jozef van der Steen, Alveus AB Consultancy, the Netherlands

Organisation of beekeeper citizen science, Robert Brodschneider, University of Graz, Austria

Monitoring of 450 non-polar or semipolar pesticides and biocides, Amadeo Fernández-Alba, Universidad de Almeria, Spain

Monitoring of microplastics, Maria Jesus Martinez-Bueno, Universidad de Almeria, Spain

Beekeepers' testimonies: Suzanne Barry (Denmark)

Q&A session

15:00-15:30 Coffee break

15:30-16:50 Presentation of the project results (continued)

Monitoring of heavy metals, Ivo Roessink, Wageningen Environmental Research, the Netherlands

Monitoring of air pollutants, Konstantinos Kasiotes, Benaki Phytopathological Institute, Greece

Monitoring of plant diversity through pollen, Alice Pinto, to Polytechnic Institute of Bragança, Portugal

Predictive models for environmental pollution, B. Buddendorf Wageningen Environmental Research, the Netherlands

Beekeepers' testimonies: Valdis Janovs, Latvia

Q&A session

16:50-17:00 Closing

Jozef van der Steen, INSIGNIA coordinator

European Commission (*tbc*)

17:00-18:00 Networking event