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Sustainable Beekeeping, *from the south of the world*

ABSTRACT BOOK

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PP-058
Climate change: tolerance, survival and dehydration of *Apis mellifera iberiensis* subspecies under different temperature and relative humidity environments

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Climate change is a source of new stressors for bees due to rising temperatures and changing rainfall patterns. This is not only a climatic stress per se, but also a nutritional stress as these changes affect the flowering times of many plant species, making spring earlier and summer longer. The MEDIBEES PRIMA project "Monitoring the Mediterranean honey bee subspecies and their resilience to climate change for the improvement of sustainable agro-ecosystems", addresses the study of the effect of climate change on different subspecies of Apis mellifera in the Mediterranean area. One of the key points to infer the adaptability of bees to these environmental changes is the study of temperature tolerance as well as the survival capacity of the different subspecies under different temperature and humidity conditions. In this study we show the results of Spanish bees (A. m. iberiensis) on their tolerance to cold and heat, their survival rate under different temperature and humidity conditions, and their tendency to dehydration. The results obtained show how the honey bee of the Iberian Peninsula is less tolerant to high temperatures than other subspecies native to warmer climates, as well as the influence of age and sex on this tolerance. Likewise, the effect of temperature and humidity as independent stressors has been evaluated, as well as their synergy, since both factors together behave as an independent stressor, through survival and body water loss studies. Our results show that for A. m. iberiensistemperatures above 40ºC are critical for survival, while high percentages of relative humidity (75%) dampen both survival and slow dehydration.

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PP-059
The Canadian Bee Gut Project

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The main goal of the Canadian Bee Gut Project is to define what constitutes a 'healthy' microbiome across starkly changing seasons and landscapes that define the Canadian beekeeping scene. This citizen science-based initiative was launched in 2022 and has so far developed a streamlined system for the strategic retrieval of bees, their guts, and associated hive data from diverse commercial Canadian operations. Our system uses return-by-mail sample tubes and hive mounted QR codes that upon scanning prompt the beekeeper to enter on-site hive and management details directly from their phone. We collect, anonymize and compile the samples and meta-data to ultimately correlate differences in honey bee gut microbiomes to colony-level outcomes year after year and region by region. Our nationwide data mapping catalogue for the honey bee metagenome is therefore vast and will enable a unified investigation of the underlying microbial interactions affecting sustainability of the Canadian beekeeping industry. Moreover, our metagenomic shotgun-sequencing and NMR-based metabolomics analysis of collected gut samples will permit the most comprehensive assessment yet of the Canadian bee microbiome taxonomic structure and its functional capacities. We expect to identify disease-causing microbes associated with colony loss but likewise can identify depletion of health-promoting symbiotic microbes or other imbalances ('missing microbes') that increase susceptibility to stressors such as pathogens and agrochemical exposure. We further expect to find previously uncharacterized honeybee-associated microbes, which could be used for new microbial therapeutic strategies in honey bees. Ultimately, the knowledge gained from this work will improve our understanding of how microorganisms impact honey bee health as well as help to guide policy geared towards sustainable management of honey bees in the agricultural sector.