EurBee 9

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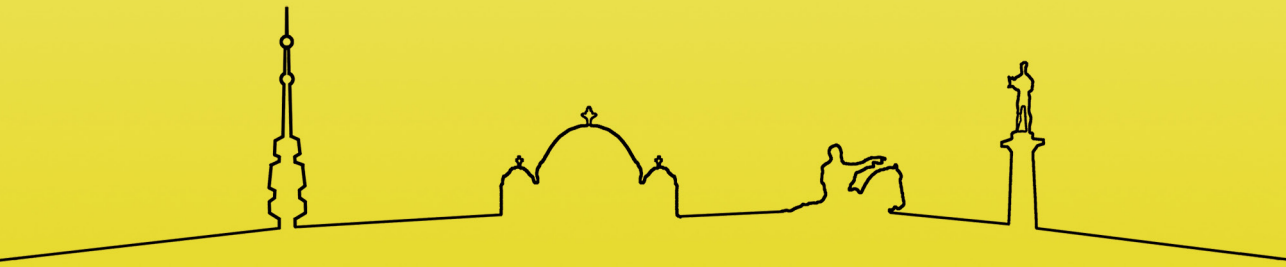
Abstract Book



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POLLINATION AND BEE FLORA

POSTERS

HONEY BEE-COLLECTED POLLEN FOR BOTANICAL IDENTIFICATION VIA ITS2 METABARCODING: A COMPARISON OF PRESERVATION METHODS FOR CITIZEN SCIENCE

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While classical palynology has been the method of choice to assess botanical diversity of bee-collected pollen for multiple purposes, DNA metabarcoding is emerging as a powerful alternative being able to achieve high taxonomic identification accuracy. Moreover, DNA metabarcoding allows analysis of hundreds of samples in a single high-throughput sequencing run, therefore offering unprecedented scale in citizen science projects. Biases in metabarcoding can be introduced at any stage of sample processing and preservation is at the forefront of the pipeline. Hence, it is important to test how sample preservation influences quality and quantitative performance of pollen metabarcoding. While in metabarcoding studies pollen has typically been preserved at –20°C (FRZ), this is not the best method to be applied by citizen scientists. In this study, we compared the freezing method with ethanol (EtOH), silica gel (SG) and room temperature (RT) for preservation of pollen collected from hives in Austria and Denmark. The pollen was stored for ~4 months before analysis. DNAs were extracted with a food kit, and their quality and concentration measured. The quality of most of the DNA extracts exhibited an absorbance ratio close to the optimal 1.8, with RT samples from Austria showing poorer quality than FRZ and SG samples ($P < 0.027$). DNA concentration also showed statistical differences, with EtOH samples producing lower yields than RT and FRZ samples in both countries and SG in Austria ($P < 0.042$). However, the floral composition (as expressed by richness, relative abundance and Shannon diversity) inferred from ITS2 high-throughput sequencing was not impacted by the preservation methods in both countries. While freezing and ethanol are normally used for archiving tissue for molecular applications, desiccation is cheaper and an easier method to use regarding both storage and transportation. Since SG is less dependent on ambient humidity and less prone to contamination than RT, we recommend SG for preserving bee-collected pollen for metabarcoding. SG is straightforward for laymen to use and so it is a robust preservation method for widespread application in citizen science studies.

Keywords: Pollen DNA metabarcoding, Preservation bias, Citizen science