PP-576 [Pollination and Bee Flora]
DNA in honey describes the changes in flower visits and microbe encounters of honey bees over decades

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Background
Recent environmental changes due to land-use and climate change threaten also pollinators and the ecosystem service, pollination, they provide. To assess and understand what has changed and how, it is vital to find ways of comparing past and current interactions between pollinators, their floral resources as well as microbes that would be both beneficial and pathogenic to pollinators and the flowering plants.

Problem description
Honey bees are one of the world's most important pollinators. To understand how their interactions with the plants they visit, and the microbes they encounter in the environment have changed, we need points of comparison from the past.

Methodology
DNA in honey offers insights into the interactions of honey bees. Old honey samples could serve to describe honey bees' interactions in previous decades, providing a baseline against which to assess changes in interactions over time. Here we identify the taxonomic origin of plant, bacterial and fungal DNA in fifty-year-old and new honey samples by DNA metabarcoding and assess whether old honey samples could serve to show the interactions in the past.

Results and conclusion
The fifty-year old honey samples had preserved DNA of plants, bacteria and fungi, allowing us to show which plants honey bees visited, as well as the microbes, including pollinator and plant pathogens, honey bees encountered and possibly spread in the past. However, some differences in the DNA recovered between old and new honey suggest that differences in DNA degradation of different microbes could bias naive comparisons between samples. Thus old honey may be most useful for identifying interactions that historically occurred and should not be taken as proof that an interaction did not occur. With this, time series of honey may offer unique information about how honey bees' associations with flowers and microbes have changed during decades of environmental change.

Practical implications for beekeepers
Using old honey samples may allow to determine which kind of changes in the environment have caused changes in the flower usage and microbe exposure of honey bees. These can be used to mitigate unwanted changes, to conserve good floral resources and to help in disease management.