

# Tracing human activity in caves of Polish Jura with the use of lipid biomarkers

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## Introduction

The presented project focuses on exploring the possibilities of using lipid biomarkers- sterols and bile acids- to reconstruct past human activity in caves of Polish Jura.

The main objective of the study is to analyse sterols and bile acids in soil samples from stratigraphic sequences of selected Polish cave sites: Bramka Rockshelter, Ciasna Cave, Koziarnia Cave, Łokietka Cave, Biśnik Cave, Shelter in Smoleń III, Sępowska Zachodnia Cave.

Sterols and bile acids are absorbed with food or produced in the organism and subsequently metabolised and excreted with faeces - their presence and ratio in faeces depend on diet, digestion and assimilation, which varies among different animal groups including humans (Cuevas-Tena, Alegría and Lagarda, 2017; Leeming, 1996).

Lipids are compounds resilient to degradation in soils, as proved by several long-term experiments (Bull et al. 2000; Simpson et al. 1998). Therefore they can be a reliable source of information about the past

The project is based on the assumption that qualitative and quantitative analysis of these compounds preserved in cave sediments will identify of their source, i.e. animals (e.g. herbivores, carnivores, etc.) vs humans.

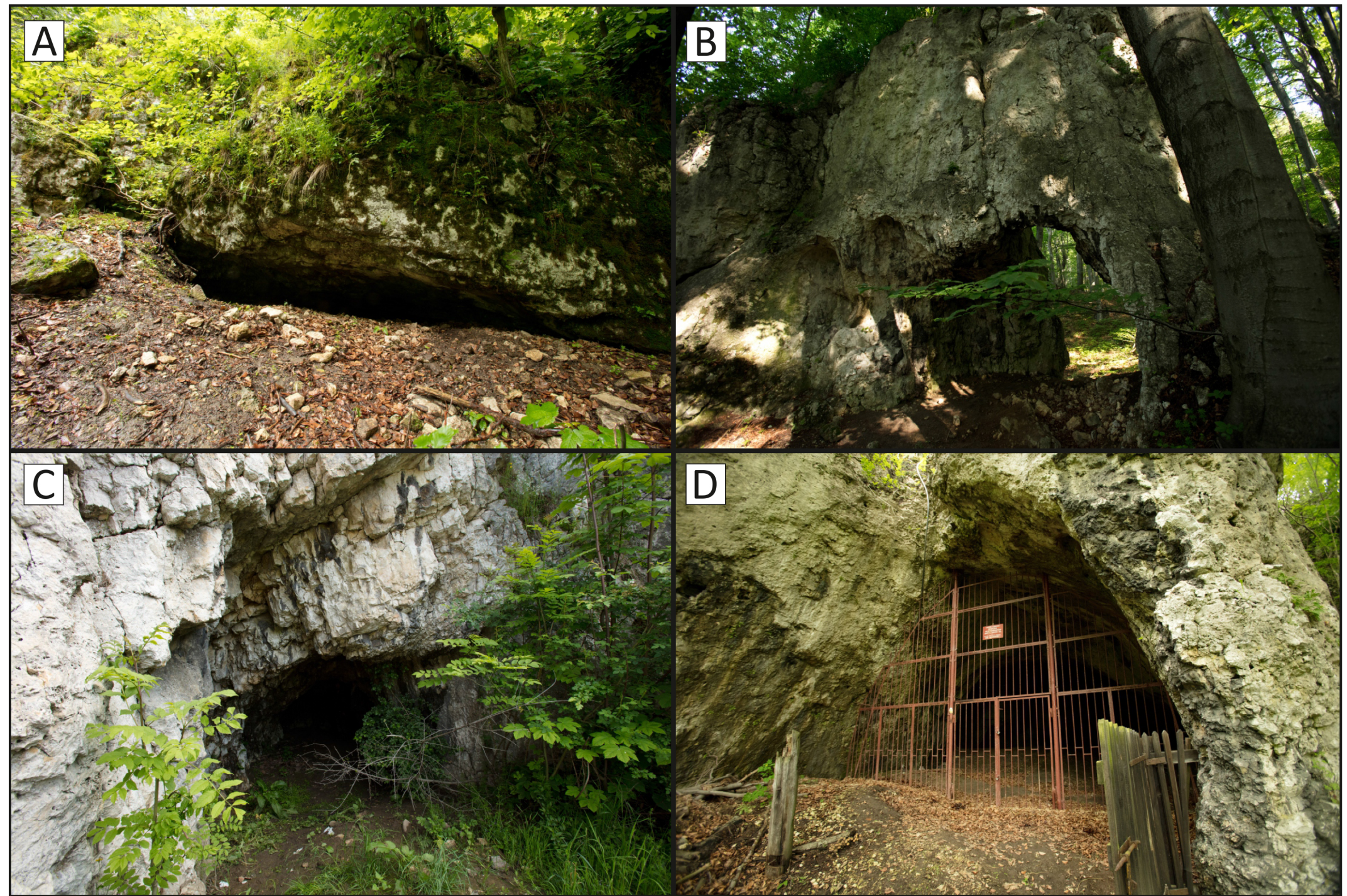


Fig.1. Selected caves included in the project: A. Ciasna Cave; B. Bramka Rockshelter; C. Sępowska Zachodnia Cave; D. Koziarnia Cave. Phot. M. Bogacki

## Material & Methods

Around 60 samples from several cave site from Polish Jura will be analysed with the use of Gas Chromatography with Mass Spectrometer according to methodology proposed by Birk et al. (2012) and Prost et al. (2017).

Analysis will be performed at the Laboratory of Biogeochemistry and Environmental Conservation (Faculty of Biology, Biological and Chemical Research Centre of the University of Warsaw).

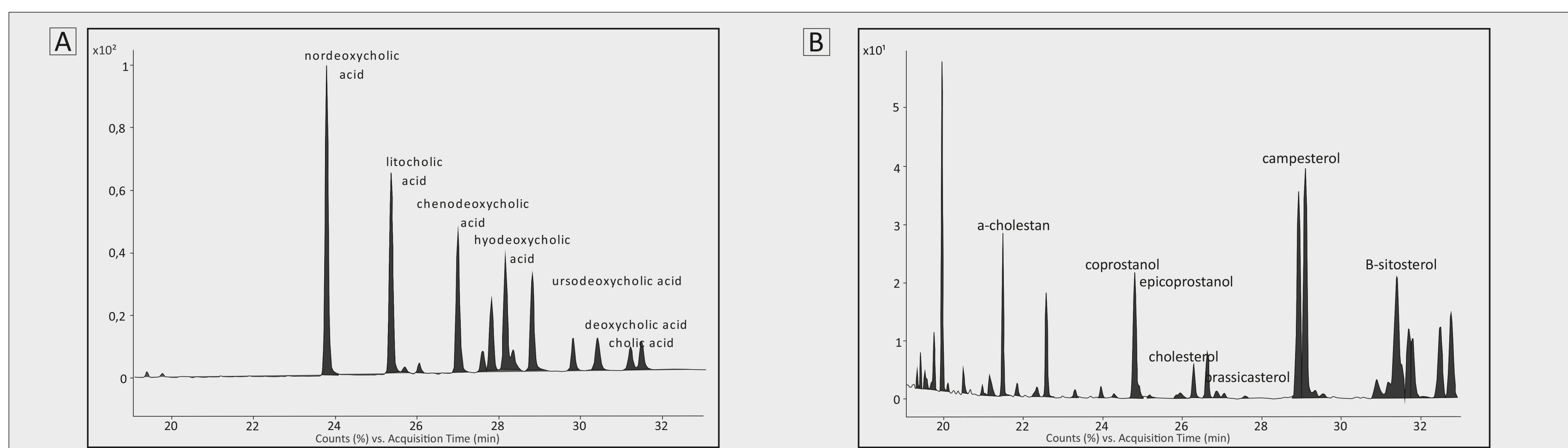


Fig.2. Results of test analysis performed on blank samples spiked with appropriate chemical standards. Test analysis was performed in order to practice procedures required for extracting, separating and cleaning sterols and bile acids, as well as to record retention times. A Chromatogram of bile acids included in the research. B. Chromatogram of sterols included in the research.

## Several questions can be posed at the start of the project:

- Can lipid biomarker analysis be successfully applied to cave sediments from the Pleistocene and Holocene?
- How do the results correspond with both archaeological and paleontological data?
- Can this analysis confirm the presence of humans in caves when no archaeological traces are visible?
- Have humans in the distant past had separate spaces for taking care of physiological needs?
- Are there traces of domesticated animals in studied caves?

## Bibliography

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