

## IDENTIFYING THE PRESENCE OF REINDEER ON A SIBERIAN ARCHAEOLOGICAL SITE USING FAECAL BIOMARKERS

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Organic geochemistry is more and more integrated into archaeological studies since it can provide molecular evidence of past occupation and activities related to a site in situations where macro- or microscopic clues can be scarce.

This is particularly true in relation to past animal husbandry activities, as noticeable amounts of faecal biomarkers can be found in soils as a result of their persistence, resilience over time and relative degradation under different environmental conditions. Faecal stanol and bile acid composition in faeces have proved to be species-specific and resilient, allowing geochemists and archaeologists to use these biomarkers to identify the presence of different species in environmental matrices.

These faecal fingerprints have mainly been used in archaeology to distinguish between species as a result of their contrasting dietary behaviours (e.g. herbivorous versus omnivorous) and sometimes to distinguish between species with generally the same diet; such discrimination could provide important information for interpretation of past activity at husbandry-related archaeological sites involving different herbivorous species.

In this paper, we focus on an archaeological site called Iarte VI, on the Iamal peninsula (northwest Siberia), which is thought to be an important site of reindeer domestication dating back to the 11<sup>th</sup>-12<sup>th</sup> century due to the enormous quantities of butchered reindeer bones found in recent excavations, and due to finds of well-preserved artefacts that have ethnographic parallels among modern Nenets reindeer-herders. There is, however, a lack of direct evidence for the presence of domesticated reindeer at the site, including structural remains such as corrals.

Near the human settlement, we conducted a soil survey and combined geoarchaeological measurements (including electrical conductivity, magnetic susceptibility and phosphate analysis) with faecal lipid analysis of soil samples, to identify the potential past presence of standing reindeer herds. Four different soil horizons separated by aeolian sands have been investigated and dated to link activities associated with reindeer herding with periods of past occupation.

Reference faecal material from species which potentially co-existed on the site (herbivorous reindeer and lemmings; omnivorous dogs and humans) were collected across northern Eurasia (mainly Scandinavia and Siberia) to build a faecal profiling database, making it possible to distinguish between these particular species and to identify the presence of these species in the soil samples from Iarte VI.

The first set of results from the soil faecal biomarker analysis show the presence of faecal material over much of the site and at different depths and occupation periods. Their corresponding faecal profiles suggest the past presence of carnivorous species, and reindeer at the site. No specific lemming signature was found but mixed profiles found in some soil samples could be the result of the presence of different species on site.

These results suggest that faecal biomarkers can be effectively used in archaeological studies to distinguish between species with different and similar diets and that the hypothesis of past reindeer herding activity on this site is confirmed by different species-specific profiles found in soil samples, allowing an improved understanding of past human-animal interactions.