



Leibniz-Zentrum für Archäologie  
Ludwig-Lindenschmit-Forum 1  
55116 Mainz  
[www.leiza.de](http://www.leiza.de)

## Press release

Mainz | 2 February 2023

---

### Neanderthals hunted elephants: Earliest evidence found of humans killing elephants for food

Mainz/Halle. Analysis of finds from the Neumark-Nord site near Halle provide first indisputable proof of active hunting of elephants by early humans and change our perception of Neanderthal lifeways.

Some 125,000 years ago, Neanderthals deliberately hunted down and slaughtered European straight-tusked elephants, whose meat and fatty tissue represented an important source of nutrition. This has been brought to light by a team of researchers from Johannes Gutenberg University Mainz (JGU), the Leibniz-Zentrum für Archäologie (LEIZA), also based in Mainz, and Leiden University in the Netherlands. The now extinct European straight-tusked elephant was the largest land-living animal at the time - with shoulder heights of up to 4 meters and body masses of up to 13 tonnes. The animal by the scientific name of *Palaeoloxodon antiquus* was characterized by its unusually long and essentially straight tusks. It has been unclear to date whether prehistoric hominins actively sought out and killed such elephants or simply scavenged from the carcasses of animals that had died a natural death. For their zooarchaeological study, the researchers used the world's largest assemblage of European straight-tusked elephant remains found at the Neumark-Nord site near Halle in Germany. According to their findings, which have now been published in *Science Advances*, Neanderthals came together - at least temporarily - in much larger social groups than had been previously assumed.

#### Unusual pattern among the Neumark-Nord straight-tusked elephant remains

*Palaeoloxodon antiquus* roamed the landscapes of Europe and Western Asia in a period 800,000 to 100,000 years ago. It was the largest land mammal of the Pleistocene epoch, a period that began three million years ago. Straight-tusked elephants were not only significantly larger than today's African and Asian elephants, but were even bigger than the also extinct woolly mammoth. The remains of at least

70 straight-tusked elephants were uncovered in the 1980s and 1990s during excavations in a gigantic lignite pit in the vicinity of Halle. These remains had been well preserved over the last 125,000 years in the fine-grained lake sediments present here.

A team of Italian paleontologists closely examined the extensive archaeological material from Neumark-Nord some 15 years ago. For them, this accumulation of elephant remains exhibited an unusual pattern in that the mortality profile seemed anything but normal. The remains were almost exclusively from adult individuals and conspicuous among these was a predominance of male animals. This pattern had not been observed before - neither in fossil nor in living elephant populations - and was difficult to explain. When Professor Sabine Gaudzinski-Windheuser began inspecting a selection of the elephant bones in early 2021, she immediately identified traces of what might have caused the peculiarity of this assemblage: human hunting. "The detection of clear and unusual lesions in the bones induced us to undertake a more detailed analysis of the elephant remains," said Gaudzinski-Windheuser, Professor of Prehistoric and Protohistoric Archaeology at JGU and Director of the Archaeological Research Center and Museum of Human Behavioral Evolution MONREPOS, an institute run under the aegis of LEIZA.

Given the uniqueness of the material and the possible implications of the study, the Dutch and German team members decided to analyze the whole assemblage, which consisted of thousands of bones and bone fragments.

Unsurprisingly, this turned out to be a very time-consuming project. They were busy for months opening the large crates in which individual elephants are stored in the reserves of the State Museum of Prehistory in Halle, team-lifting the large and heavy bones to view their surfaces. They also had to handle every piece of bone, identify its location in the skeleton, locate anthropogenic and/or carnivore modifications, and document any apparent changes. "In total, we looked at 3,122 faunal remains of European straight-tusked elephants that had been deposited at the Neumark-Nord site," said Dr. Lutz Kindler, research associate at MONREPOS.

### **Hunting massive proboscideans to sustain nutritional needs**

The archaeological analysis focused on how the lesions were distributed across the skeletal remains. The conclusion reached was that hunting of these Ice Age megafauna in this area continuously occurred over a period of 2,000 years, for dozens of generations. "This constitutes the first clear-cut evidence of elephant hunting in human evolution," commented Professor Wil Roebroeks of Leiden University. Adult male individuals, much larger than the females, are overrepresented in the assemblage, probably because, as with present-day elephants, male adult elephants kept to themselves. Compared to females, they were easier to approach closely without the protection of a herd. Since they were also much larger, hunting them would have yielded much higher returns, for significantly less risk.

## Neanderthal cooperation and group size

Hunting these large animals demanded close cooperation between the participating group members, just like prey processing, which entailed extensive butchering, including removing meat scraps from the long bones as well as the fat-rich foot cushions. Processing may also have entailed drying products for long-time storage.

The authors calculate that a ten tonnes elephant - not the largest one at Neumark-Nord - could have yielded a minimum of 2,500 adult Neanderthal rations of 4,000 kcals, consisting of a safe mixture of protein and fat from one animal only. These figures are important as they suggest that Neanderthals, at least temporarily, congregated in groups much larger than the about 25 individuals usually seen as the maximum size of a local group and/or that they had cultural means for large-scale food preservation and storage. The authors leave both options open, but emphasize that both are socially and cognitively important findings, which contribute significantly to our understanding of the range of variation in Neanderthal behavior.

## The Neumark-Nord site: A well-preserved archaeological landscape

The Neumark-Nord site complex was discovered in the 1980s by German archaeologist Dietrich Mania, who led a series of rescue excavations in the large brown coal quarry. It was Mania, a former professor at the University of Jena, who initiated a long-term interdisciplinary study of the site. Involved in the corresponding excavations from 2004 to 2008 were the current cooperating partners of Johannes Gutenberg University Mainz, MONREPOS, and Leiden University. With an overall size of over 74 acres, Neumark-Nord is among the largest Pleistocene archaeological site complexes and stands out through its extraordinary preservation of Last Interglacial flora and fauna.

The ongoing work of the teams from Mainz and Leiden includes a substantial re-analysis of the rich assemblages excavated in the 1980s and 1990s. This has, for instance, yielded evidence for close-range hunting of deer by Neanderthals, in the form of the earliest known hunting lesions on bones. In 2021, the group published high-resolution data demonstrating that Neanderthals visibly impacted their environment. With their arrival in the Neumark-Nord region, woodland receded and open vegetation came to dominate the area during the roughly 2,000 years of their presence, associated with their abundant use of fire. This constitutes the earliest clear case of landscape modification in human evolution.

## Publikation

S. Gaudzinski-Windheuser et al., Hunting and processing of straight-tusked elephants, 125,000 years ago: Implications for Neanderthal behavior, *Science Advances* 9: 5, 1. Februar 2023,

DOI: [10.1126/sciadv.add8186](https://doi.org/10.1126/sciadv.add8186)

### Wissenschaftlicher Kontakt

Prof. Dr. Sabine Gaudzinski-Windheuser  
Arbeitsbereich Vor- und Frühgeschichtliche Archäologie  
Institut für Altertumswissenschaften  
Johannes Gutenberg-Universität Mainz  
55099 Mainz  
Tel. 0170-4519055  
sabine.gaudzinski@leiza.de

### Dr. Lutz Kindler

MONREPOS Archäologisches Forschungszentrum und Museum für menschliche  
Verhaltensevolution, LEIZA  
Schloss Monrepos  
56567 Neuwied  
Tel. 0178-2985883  
lutz.kindler@leiza.de

### Prof. Dr. Wil Roebroeks

Faculty of Archaeology  
Universität Leiden  
2300 RA Leiden, NIEDERLANDE  
Tel. +31 6 53161760  
j.w.m.roebroeks@arch.leidenuniv.nl

## Leibniz-Zentrum für Archäologie (LEIZA)

The Leibniz-Zentrum für Archäologie (LEIZA) studies the material legacies from 3 million years of human history. The aim is to use archaeological finds and findings to demonstrate and understand human behaviour and actions, human activity and thinking, and the development and change of societies. The RGZM operates worldwide and has so far conducted successful and comprehensive research in various regions of Africa, Asia and Europe, with a geographical focus on Central and Southern Europe as well as the Mediterranean region. The unique concentration of archaeological, scientific, conservative and information-technological competences, combined with important workshops, laboratories and archives, makes it possible to conduct object-oriented research on the archaeology of the Old World (Asia, Africa, Europe) from the beginnings of human history to modern times.

Until its renaming on 1 January 2023, the LEIZA was internationally known as the Römisch-Germanisches Zentralmuseum (RGZM), which was founded in 1852 in Mainz by resolution of the German history and antiquities societies. [www.leiza.de](http://www.leiza.de)

## MONREPOS Archaeological Research Centre and Museum for Human Behavioural Evolution

MONREPOS is at the same time museum and research institute. It is a department of the Römisch-Germanisches Zentralmuseum Mainz, a Leibniz-Association research institute, located in the Monrepos stately home near Neuwied, where research has been conducted for more than 30 years. The research centre and museum is closely linked to the section of Pre- and Protohistoric Archaeology at the Institute of Ancient Studies of the Johannes Gutenberg University Mainz.

Our research focuses on the inheritance we carry within us, which is worth millions: Our human behaviour has evolved over more than 2.6 million years. This early human history spans the longest and defining period of our behavioural evolution, that is central to our research at MONREPOS. Our archaeology thrives on working together, on questions, impulses, discussion. And, not least, on criticism and on tolerance. It needs people who are curious, creative and courageous - whether these are scientists, pro bono helpers, media or visitors. MONREPOS sees itself as a platform for everyone who wishes to understand how we evolved and what unites us.