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LEIPZIG**New study: Leipzig research team discovers possible Black Death mass grave near Erfurt (Germany)**

An interdisciplinary research team from Leipzig has discovered strong evidence of a Black Death mass grave near the deserted medieval village of Neuses, outside Erfurt (Germany). It represents the first systematically identified burial site associated with plague burials in Europe. The study, conducted primarily by Leipzig University, the Leibniz Institute for the History and Culture of Eastern Europe (GWZO), and the Helmholtz Centre for Environmental Research (UFZ), has just been published in the renowned scientific journal *PLOS One*.

The research team combined historical sources, geophysical measurements, and sediment coring to identify a burial structure corresponding to the plague pits described in 14th-century written records.

A new window into Europe's deadliest pandemic

Between 1346 and 1353, the plague pandemic known as the Black Death claimed up to half of Europe's population, depending on the region. In Central Europe, Thuringia represented one of the easternmost areas affected by the plague. Contemporary chronicles report that during the outbreak of 1350, around 12,000 people were buried in eleven large pits outside the city of Erfurt – but their exact locations had remained unknown. Using electrical resistivity mapping and sediment coring, the team reconstructed the medieval land surface and detected a large subsurface structure (approximately 10 m x 15 m x 3.5 m) containing heavily mixed sediments and fragments of human remains. Radiocarbon dating places the human remains recovered from the boreholes clearly in the 14th century. "Our results strongly suggest that we have pinpointed one of the plague mass graves described in the Erfurt chronicles. Definitive confirmation, however, will only be possible through planned archaeological excavation," explains Dr Michael Hein, lead author and geographer at Leipzig University.

"A major achievement of this study is that the find was made through an interdisciplinary prospection approach combining historical research with natural science methods – rather than through accidental discovery," adds Dr Ulrike Werban from the Helmholtz Centre for Environmental Research (UFZ).

The landscape as a historical archive

The researchers show that natural soil conditions – fertile agricultural soils called chernozems and moist floodplain deposits – shaped both settlement patterns and burial practices in the Middle Ages. The reconstructed site of the former village of Neuses, as well as the identified burial pit, lie in the drier chernozem zone along the valley edge of the River Gera. The wetter floodplain soils were evidently avoided for burials, as decomposition proceeds more slowly under such conditions. "This finding aligns with both modern soil science and the medieval 'miasma theory', which held that diseases spread through 'bad air' and 'vapours' arising from decaying organic matter," notes Dr Martin Bauch of the GWZO.

From a medieval perspective, plague would have been more difficult to contain in damp areas – also helping to explain, alongside legal and political factors, why burials took place far outside the city walls. “By linking historical, geophysical, and pedological methods, we were able to read the landscape as an archive,” says Dr Hein. “This approach may also help to locate and protect other epidemic- or conflict-related mass graves in the future.”

Scientific and cultural significance

Confirmed and precisely dated Black Death mass graves remain exceedingly rare – fewer than ten are known across Europe. The find near Erfurt not only adds an important piece to the city’s medieval history, which was recognised in 2023 with UNESCO World Heritage status.

It also opens up new opportunities for genetic and anthropological analyses. These may shed light on the evolution of the pathogen *Yersinia pestis*, the causes of the high mortality in the mid-14th century, and the ways in which societies coped with epidemic crises. Beyond its historical implications, the project provides a model for non-invasive archaeological prospection that is valuable for heritage conservation and forensic investigations alike.

In collaboration with the Thuringian State Office for Heritage Management and Archaeology, further excavations are planned. These will provide material for genetic analyses at the Max Planck Institute for Evolutionary Anthropology (MPI-EVA) in Leipzig. “This discovery is not only of archaeological and historical importance,” says Professor Christoph Zielhofer, head of the Historical Anthropospheres research group at Leipzig University’s LeipzigLab. “It helps us to understand how societies deal with mass mortality – and how modern interdisciplinary science can contribute to locating mass graves, topics that remain relevant even in the 21st century.”

Participating institutions: Leipzig University · Helmholtz Centre for Environmental Research (UFZ) · Eberhard Karls University Tübingen · Leibniz Institute for the History and Culture of Eastern Europe (GWZO) · Max Planck Institute for Evolutionary Anthropology · Thuringian State Office for Heritage Management and Archaeology and Leuphana University Lüneburg.

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Study co-authors Nik Usmar (left) and Dr Michael Hein (right) carry out sediment coring to locate a medieval plague mass grave near Erfurt.

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