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Late Quaternary woolly mammoth (*Mammuthus primigenius* Blum) remains from southern Transdanubia, Hungary

*Restes de mammouth laineux (*Mammuthus primigenius *Blum) du Quaternaire tardif de la Transdanubie méridionale, Hongrie*

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ABSTRACT

Six samples of subfossil tusk, bone and tooth remains from the woolly mammoth (*Mammuthus primigenius* Blum) were discovered in south-western Hungary. The remains are relatively well preserved in a Late Pleistocene loess deposit. The samples have been radiocarbon dated (AMS) and are of Late Weichselian (MIS 2) age (21.8–24.1 ka cal BP). The skull fragments, the tusks and maxillary teeth are in close proximity to associated postcranial remains, indicating that the mammoth died where it was found. The size and characteristics of skeletal elements have allowed us to determine that this was a mature male of about 38 years of age.

Mots clés :
Proboscidea
Mammuthus primigenius
Pléistocène tardif
Taxonomie
Taphonomie
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Hongrie

RÉSUMÉ

Six échantillons de restes de défense, de dent et d'os de mammouth laineux (*Mammuthus primigenius* Blum) ont été découverts dans le Sud-Ouest de la Hongrie. Ces restes sont relativement bien conservés dans un dépôt loessique du Pléistocène tardif. Les échantillons ont été datés au radicarbonne (AMS) et sont du Wechsélien tardif (MIS 2), d'âge 21,8 à 24,1 ka cal BP. Les fragments de crâne, les défenses et les dents maxillaires sont très proches de restes post-craniaux associés, indiquant que le mammouth est mort là où il a été trouvé. La taille et les caractéristiques des éléments du squelette nous ont permis de déterminer qu'il s'agissait d'un mâle mature, d'environ 38 ans.

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1. Abbreviations

AA	AMS Laboratory, Tucson, Arizona, USA
DEB	Laboratory of Environmental Studies, Institute of Nuclear Research (Hungarian Academy of Sciences), Debrecen, Hungary
UP	University of Pécs, Hungary
PURAM	Public Agency for Radioactive Waste Management, Hungary
M3	upper molars
HI	hypsodonty index
CDJ	cementum-dentin junction
OASA	optical analysis of the Schreger angles
ZM	Zók Mammoth
AEY	African Elephant Years

2. Introduction and geological setting

The woolly mammoth *Mammuthus primigenius* (Blumenbach, 1799) is the most important representative of the Eurasian Late Pleistocene megafaunal assemblage (Kuzmin and Orlova, 2004). The study of mammoth extinction patterns is crucial for understanding the impact of global environmental changes on the mammalian populations at the end of the Pleistocene (Kuzmin and Orlova, 2004). Typical, the woolly mammoth is best known from the Weichselian (Last) glaciation (*c.* 100–10 ka). During the Last Cold Stage, the woolly mammoth occurred widely across northern Eurasia, including nearly all of Europe, mostly in association with regional treeless steppe-tundra vegetation (Allen and Huntley, 2000; Gheerbrant and Tassy, 2009; Lister and Sher, 2001; Lister et al., 2005; Pazonyi, 2004; Svoboda et al., 2005; Wojtal and Sobczyk, 2005).

Fossil remains of *Mammuthus primigenius* are common in Hungary; *c.* 400 specimens have been recovered; among these are five complete skeletons (Főzy and Szente, 2007; Gasparik, 2001; Vörös, 1981). A woolly mammoth, was excavated by students in a vineyard near the city of Pécs (Zók), located in a loess road cut (Fig. 1). The locality occurs on a hillslope 10 km from Pécs. The mammoth occurred at a depth of *c.* 70 cm within a leached, yellow loess unit (Fig. 2). Total loess thickness at the site is ~18 m, with yellow silt being ~12 m thick and the underlying yellow-grey, fine sand ~4 m thick (Sebe et al., 2008). The upper 4 m thick layer is rich in terrestrial Mollusks (*Cochlicopa lubrica, Vallonia costata, Zonitoides nitidus, Arianta arbustorum, Trichia*

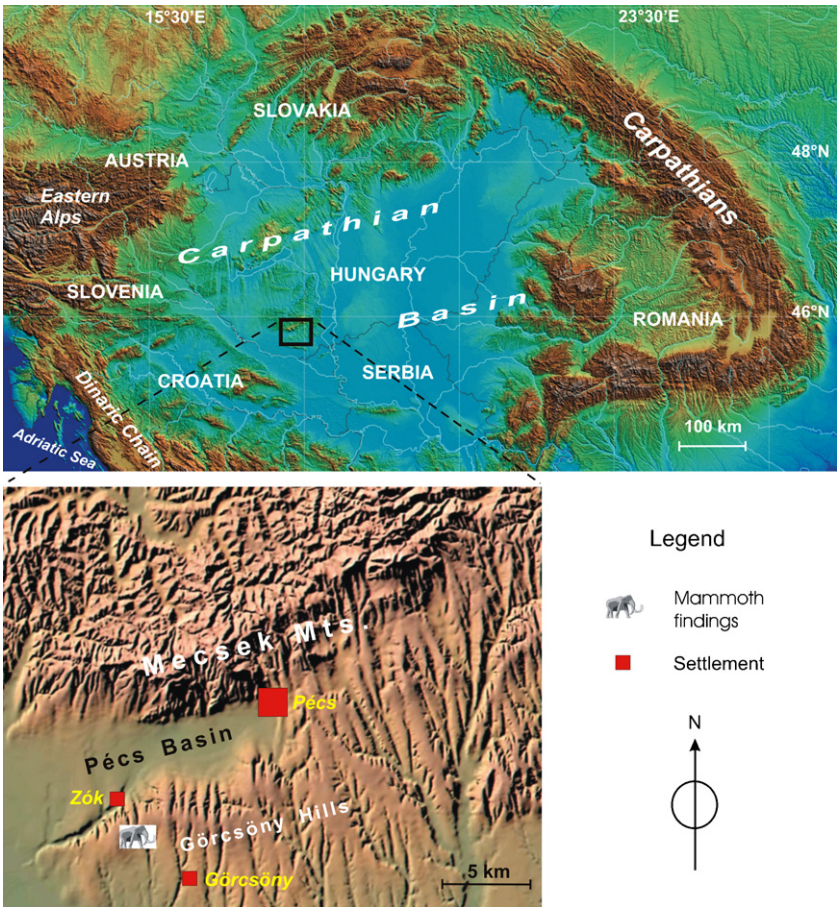

Fig. 1. Location of the mammoth remains in southern Transdanubia, Hungary (map is modified after Horvath and Bada, 2005).
Fig. 1. Localisation des restes de mammouth en Transdanubie méridionale, Hongrie (carte modifiée d'après Horvath and Bada, 2005).