

## THE STRAIGHT-TUSKED ELEPHANTS FROM NEUMARK NORD 1: THE STATE OF ART

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ABSTRACT: Marano F. & Palombo M.R., *The straight – tusked elephants from Neumark Nord: the state of art.* (IT ISSN 0394-3356, 2011)

The German sites bearing straight-tusked elephant remains cover a period from 400 Ka (MIS 11) to the Eemian age (MIS 5e). The material excavated since 1980, in the lacustrine sediments of Neumark Nord (Eastern Germany), is one of the most outstanding samples of straight-tusked elephants in Europe. The Neumark-Nord material enhances our knowledge of the body size, sexual dimorphism, ontogenetic growth and morphological variability of *Palaeoloxodon antiquus*.

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I siti tedeschi in cui sono stati ritrovati resti di "elefante antico" coprono l'intervallo temporale da 400 Ka (MIS 7) fino all'interglaciale Eemiano (MIS 5e). Il materiale recuperato dal 1980 nei depositi lacustri di Neumark Nord1 (Germania orientale) è tra i più affascinanti e rilevanti di Europa ed ha significativamente contribuito ad ampliare le nostre conoscenze sulla taglia, il dimorfismo sessuale, la crescita ontogenetica e la variabilità morfologica della specie *Palaeoloxodon antiquus*.

Key words: *Palaeoloxodon antiquus*, Neumark Nord 1, MIS7?, MIS5e?, Germany

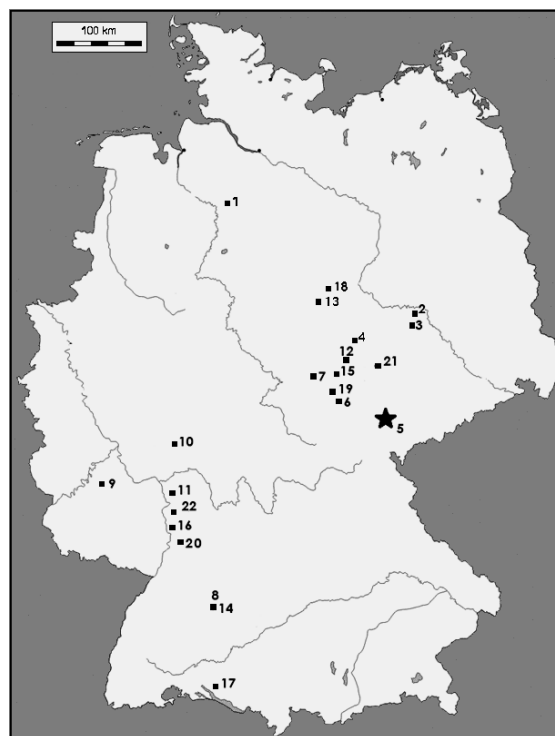
Parole chiave: *Palaeoloxodon antiquus*, Neumark Nord 1, MIS7?, MIS5e?, Germania

The German sites bearing straight-tusked elephant remains cover a period from about 400 Ka (MIS 11) to about 110 ka (Eemian, MIS 5e). The fossil records mainly consist of isolated remains, while more or less complete skeletons are reported from a few localities (Fig. 1). Among these, the site at Neumark Nord 1 (NN1) is of outstanding interest because of the number of bones and the excellent preservation of elephant remains retrieved since the '80s from the lacustrine sediments filling this small endorheic basin. The age of the fossiliferous sequence is still a matter of debate. Some authors claimed it could be dated to the Middle Pleistocene (MIS 7), based on pollen data, as well as on the presence of the rodent *Apodemus maastrichtensis* (see SEIFERT-EULEN, 2010; HEINRICH, 2010). Others consider them to have been deposited during the Eemian interglacial (MIS 5e) (KOLFSCHOTEN, 2000, KOENIGSWALD, 2007), as suggested by recent ESR dating (SCHÜLER, 2010).

The rich paleontological sample from NN 1 consists of about two hundred species of plants as well as invertebrates, insects, and a diversified vertebrate fauna, including *Palaeoloxodon antiquus*, three species of rhinoceros, fallow deer, red deer, aurochs as well as some carnivores such as wolf, lion and spotted hyaena (MANIA, 2010).

### 1. PALAEOLOXODON ANTIQUUS FROM NEUMARK NORD 1

The straight-tusked elephants from Neumark-Nord 1 provide outstanding information on the morphology and biometry of European *P. antiquus*, and



1-Legringen, 2-Gröbern, 3-Grabschutz, 4-Rabutz, 5-Neumark Nord, 6-Taubach Weimar, 7-Burgtonna, 8-Stuttgart-Untertürkheim, 9-Binsfeld, 10-Kiesächer, 11-Crumstadt, 12-Bilzingsleben, 13-Schöningen, 14-Bad Cannstatt, 15-Memleben, 16-Mauer, 17-Karlich seeufer, 18-Schönebeck, 19-Süssenborn,

Fig. 1, Localization of the German sites where *Palaeoloxodon antiquus* was retrieved.

Localizzazione dei siti tedeschi in cui sono stati ritrovati

enhance our knowledge of the body size, sexual dimorphism, ontogenetic growth and morphological variability of this species (PALOMBO & FERRETTI, 2010; PALOMBO *et al.*, 2010).

More than 1500 elephant remains (among which more than 90% have been identified) have been retrieved from 6 fossil-bearing layers within the lower, middle and upper “gyttja”, which represent

successive filling episodes during an interglacial phase. Most of remains were found in the middle “gyttja”, 6.1 and 6.2 layers, both deposited during a lake level reduction (see MANIA, 2010).

The minimum number of individuals found at NN 1, inferred on the basis of the location of the finding, the size of the remains, the degree of epiphysis fusion, as well as the progression in tooth eruption,

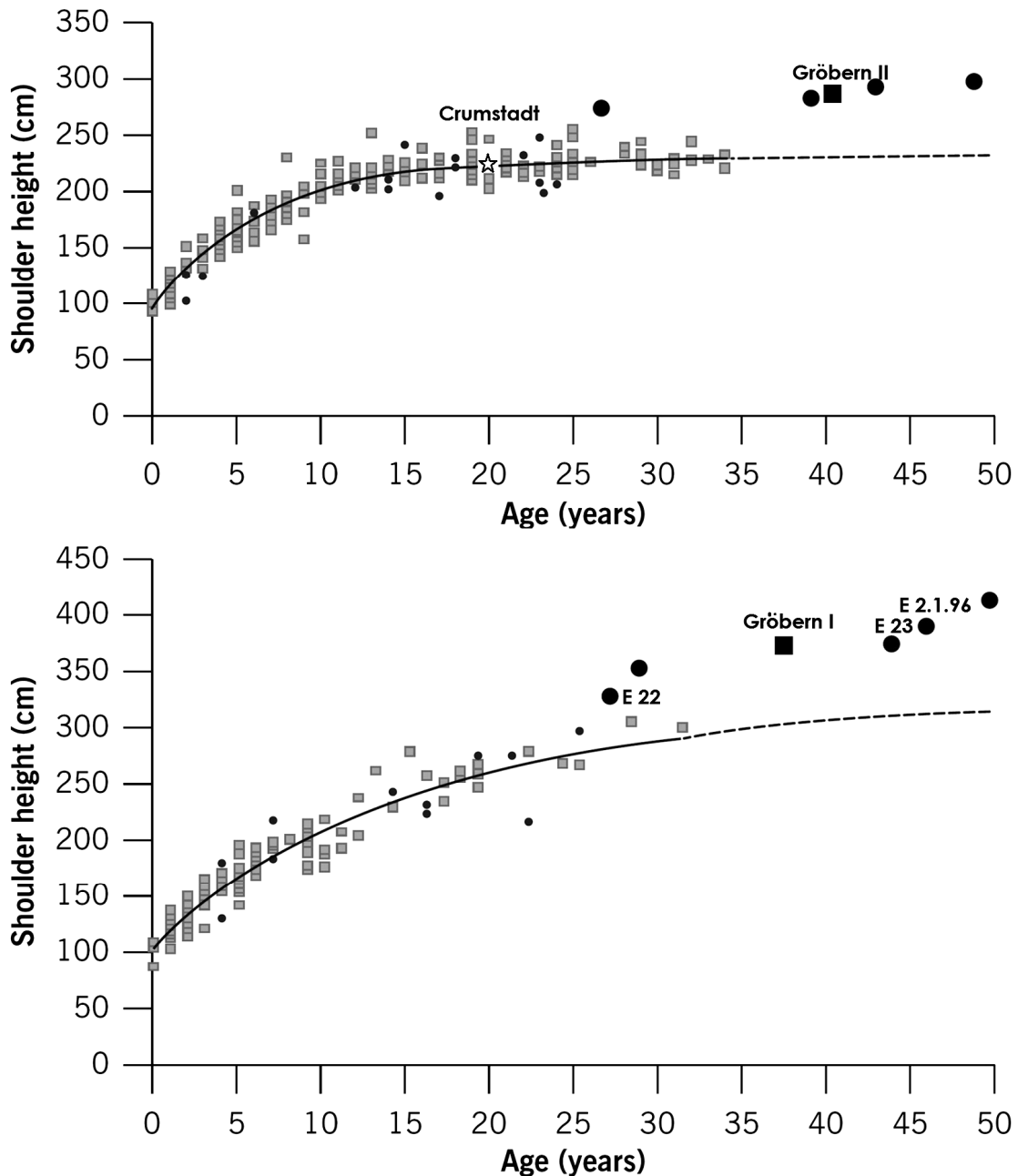


Fig. 2, Comparison of the shoulder height, as a function of known age, calculated for female and male elephants from Neumark-Nord (big points), the specimens from Gröbern (large squares) and the specimen from Crumstadt (star), and the shoulder height of African elephants from the Amboseli National Park (Kenya) (small squares) and Addo Elephant National Park (South Africa) (small points).

*Confronto tra le altezze alla spalla in funzione dell'età calcolate per gli esemplari maschili e femminili di Neumark Nord1 (punti grandi), quelli di Gröbern (quadrati grandi) e di Crumstadt (asterisco) e le altezze degli esemplari Africani del National Park (Kenya)(quadrati piccoli) e Addo Elephant National Park (Sud Africa) (punti piccoli).*

should be nearly 70.

Nevertheless, this number might be overestimated, because of the difficulty in assessing largely incomplete bones, seriously damaged by excavators (Palombo *et al.*, 2010).

The age of 35 individuals, and the sex of only 26 has been confidently determined. In the examined sample, adult individuals older than twenty five (94.3%) and males (61.5%), definitely prevail.

The maximum body mass should range from about 6000 kg in relatively young (24–28 years old) individuals to about 11000 kg in adult males (49 years old), and from about 4500 kg in young individuals (24–28 years old) to about 6000 in adult females.

The size of straight-tusked elephants from NN 1 is consistent with that of the adult elephants found at Gröbern (Sachsen-Anhalt, Germany) and of the young specimen from Crumstadt (Hessen, Germany) (Fig. 1).

At Gröbern, two nearly complete skeletons belonging to a male (Gröbern I) and a female (Gröbern II), both 35–40 years old, have been retrieved from lacustrine sediments dated to the Eemian (KROLL, 1991; GÖHLICH, 2000; WEBER, 2000). The adult male from Gröbern is slightly larger than the males from NN 1. Indeed its size is similar to that of the NN 1 specimens, E 2.1.96 (2007:25.279) and E 23 (2007:25.285), which are each about 47 years old. Conversely, the size of the female is close to the size of a female (specimen E8, 2007:55) of about the same age found at NN 1 (MARANO & PALOMBO, in press).

The juvenile female (20 years old) specimen from Crumstadt (Hessen, Germany) (KROLL, 1991), is smaller than all of the females found at NN1. However, none of the complete skeletons from NN1 is comparable in age to the Crumstadt specimen. The youngest, a male six years older than the female from Crumstadt, is definitely larger, stressing the sexual dimorphism that characterizes straight-tusked elephants (Fig. 2).

All in all, the elephants from Neumark-Nord 1 share most of the basic traits with the other German straight tusked elephants, which reveal a comparable size and a remarkable dimensional gap between the sexes. Moreover, the analyzed

data confirm the considerable morphological variability of this species.

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