

PRELIMINARY ANALYSIS OF *BOS PRIMIGENIUS* BOJANUS, 1827 FROM AVETRANA (SOUTHERN ITALY)

Carmelo Petronio, Leonardo Salari & Luca Pandolfi

Dipartimento di Scienze della Terra, Sapienza, Università di Roma
Corresponding author: C. Petronio <carmelo.petronio@uniroma1.it>

ABSTRACT: Petronio C., Salari L. & Pandolfi L., *Preliminary analysis of Bos primigenius Bojanus, 1827 from Avetrana (Southern Italy)*. (IT ISSN 0394-3356, 2011)

Abundant remains of *Bos primigenius* have been recovered in the early Late Pleistocene site of Avetrana (Southern Italy). The remains of auroch are referred to at least 37 individuals. Also, biometrical analysis of the metapodial bones of the female aurochs from Avetrana gave the cue to examine the evolutive trend of the species.

RIASSUNTO: Petronio C., Salari L. & Pandolfi L., *Analisi preliminare di Bos primigenius Bojanus, 1827 di Avetrana (Italia Meridionale)*. (IT ISSN 0394-3356, 2011)

Resti abbondanti di *Bos primigenius* sono stati rinvenuti nel sito di Avetrana (Italia Meridionale), riferibile alla prima parte del Pleistocene Superiore. I resti di uro sono riferibili ad almeno 37 individui. Inoltre, l'analisi biometria dei metapodiali degli individui femminili di Avetrana ha dato lo spunto per esaminare il trend evolutivo della specie.

Key words: *Bos primigenius*, Avetrana, early Late Pleistocene, evolutive trend

Parole chiave: *Bos primigenius*, Avetrana, Pleistocene Superiore iniziale, trend evolutivo

The auroch, *Bos primigenius* object of the present study, was found in a karst cavity near Avetrana, in the south-eastern area of Taranto (Apulia, Southern Italy) (SARDELLA *et al.*, 2005; PETRONIO *et al.*, 2008). The karst filling is rich in bone remains and, on the base of the faunal assemblage, PETRONIO *et al.* (2008) refer the deposit to the early Late Pleistocene (Melpignano Faunal Unit). The auroch is the best represented species in the site of Avetrana. Except for a limited number of elements, which are referable to young subjects, almost the whole of the bones is attributable to adult and sub-adult specimens. The upper and lower teeth are the most recurrent remains, and on the whole they are in very good condition. The tooth and bone remains are in total referred to at least 37 individuals: four calves of less two years old, five young individuals of just over two years and at least 28 adult individuals with upper and lower teeth (particularly the third lower molar was considered) in different stage of attrition. Both the principal component analysis (PCA) of the metapodial bones (Fig. 1A) that the Howard coefficients show that the aurochs of Avetrana are predominantly females. Solely one intact metatarsus and a few distal portions of metacarpus can be referred to males. The estimated withers height shows a population of auroch with a mean height of about 158.7 cm (153.5 cm from tibia, between 151.4 and 168.5 cm from metacarpus and between 153.5 and 165.8 cm from metatarsus) and 156.9 cm considering the females only. The analysis of biometrical characters of the *B. primigenius* metapodial bones from Avetrana gave the cue to examine the evolutive

trend of the species in Southern Europe, from the Middle Pleistocene to Holocene. To compare the data of the metapodial bones from Avetrana with the other from the different sites of Southern Europe, we have excluded the males. This fact is due to the sexual dimorphism of the species that can alter the results of the diagrams. The box plot relative to the greatest length of the metacarpus (Fig. 1B) show the dimensional trend of the different female populations in the considered time spans. From left to right are reported six chronological intervals from the first occurrence of the species (Middle Pleistocene, MPL0) to Holocene. As show in the box plot, the greatest length of the metacarpus has a general increase during the late Middle Pleistocene (MPL1), with a maximum in correspondence to the early Late Pleistocene (LPL1, represented by the sites of Avetrana and Melpignano). An opposite trend is recognized from the upper Late Pleistocene (LPL2) to Holocene. The same tendency is recognized even for the distal transverse diameter of the metacarpus (Fig. 1C). As for the greatest length, the maximum point is recorded in correspondence to the LPL1 (only Avetrana). What has been shown for the metacarpus, it's visible for the metatarsus in the box plot concerning the greatest length (Fig. 2D) (LPL1 is represent only by Avetrana). Furthermore, a general change in the shape of the metapodial bones is observable. In particular, during its first occurrence (MPL0), the species is characterized by a "clepsidra" shape of these bones. The two epiphysis, and in particular the distal epiphysis, seem to be more developed than the diaphysis. The same

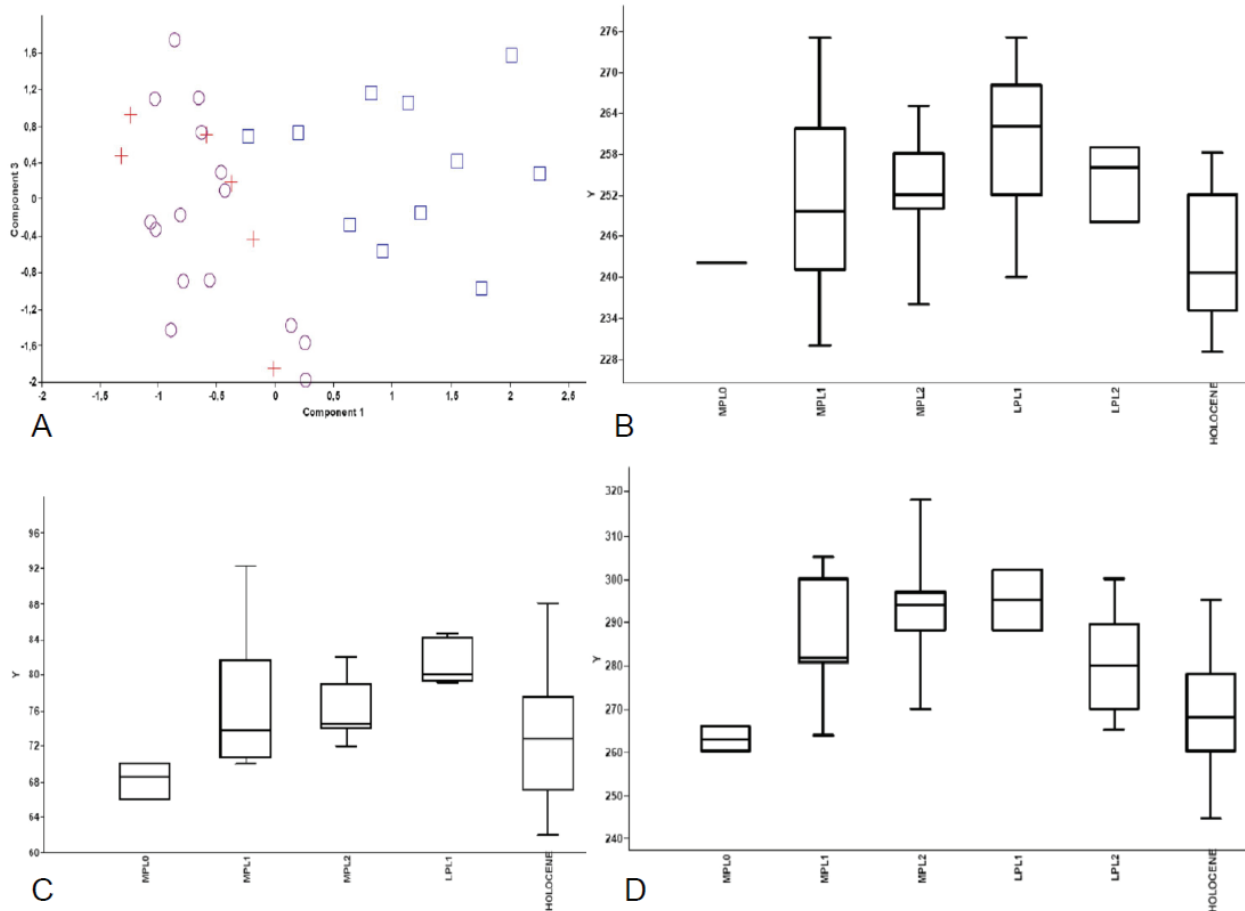


Fig. 1. A: PCA of metacarpus from Avetrana (cross) and males (square) and females (circle) from different Pleistocene sites of Europe; B, C, D: Box plot for the greatest length (B) and distal breadth (C) of the metacarpus and the greatest length of metatarsi (D) from Avetrana and from different sites of Europe (data from REQUATE, 1957; STAMPFLI, 1963; FLEROW & RESHETOV, 1972; GERBER, 1972; ALTUNA, 1974; CALOI & PALOMBO, 1979; DESCOMBES, 1980; JANOSSY & VÖRÖS, 1981; CAMPY *et al.*, 1983; BRUGAL, 1985; VÖRÖS, 1987; TUFFREAU *et al.*, 1995 and taken by the authors). MPL0 = about 650-500 ky; MPL1 = about 480-300 ky; MPL2 = about 300-200 ky; LPL1 = about 125-0,80 ky; LPL2 = about 75-20 ky.

A: PCA dei metacarpi di Avetrana (croce) e dei maschi (quadrato) e delle femmine (cerchio) di differenti siti del Pleistocene dell'Europa; B, C, D: Box plot della lunghezza massima (B) e del diametro distale (C) dei metacarpi e della lunghezza massima dei metatarsi (D) di Avetrana e di differenti siti dell'Europa (dati da REQUATE, 1957; STAMPFLI, 1963; FLEROW & RESHETOV, 1972; GERBER, 1972; ALTUNA, 1974; CALOI & PALOMBO, 1979; DESCOMBES, 1980; JANOSSY & VÖRÖS, 1981; CAMPY *et al.*, 1983; BRUGAL, 1985; VÖRÖS, 1987; TUFFREAU *et al.*, 1995 e presi dagli autori). MPL0 = circa 650-500 ma; MPL1 = circa 480-300 ma; MPL2 = circa 300-200 ma; LPL1 = circa 125-0,80 ma; LPL2 = circa 75-20

shape of the Middle Pleistocene (MPL0) is recognized even during the Holocene. During the MPL1, MPL2 and LPL1, instead, the metapodial bones seem to have a more "columnar" shape. According to some Authors (PETRONIO *et al.*, 2008; DEGERBØL & FREDSKILD 1970; BRUGAL, 1985; CERILLI & PETRONIO, 1992), the auroch is characterized by a relative decrease in size during the Late Pleistocene and the Holocene. However, the marked sexual dimorphism of this species has been not well considered for the analysis of the evolutive trend. This fact has the consequence to hide the effective decrease or increase in size of the different populations during the time. In the present study, the comparative analysis of the explained diagrams allows to recognize a trend in the dimensional

variations of the female aurochs. In this trend, we can justified the small-sized aurochs of the Middle Pleistocene with the presence in Southern Europe of a cool climate. In fact, the first occurrence of the species in Europe, reported in the sites of Venosa and Rome GRA Km 2 (Southern and Central Italy) (CALOI & PALOMBO, 1979, 1986), are related with the MIS 16 and 14 (about 650-550 ky) characterized by a temperate-cool climate. The large-sized aurochs of the latest Middle Pleistocene and especially the early Late Pleistocene can be related with a temperate-warm climate, as soon as the decrease in size of the upper Late Pleistocene with the climatic deteriorations of the last glacial event. Also, considering the presence/absence of the genus *Bison*, and the increase of human presence,

we have notice some correlations with the variations in size of the aurochs. In particular, during the first occurrence of the *Bos*, in Southern Europe the presence of *Bison schoetensacki* is very relevant. This last species disappears during the late Middle Pleistocene, when the aurochs increase in size. In the upper Late Pleistocene, the climatic deterioration and the extension of the steppe environment favour the increase of presence of *Bison priscus* in Southern Europe, factors that can be compete to the decrease in size of *B. primigenius*. During the second Pleniglacial stage and the Holocene, the affirmation of human presence in Southern Europe can be the prevailing factors in the progressive rarefaction and the decrease in size of the aurochs. During this time span, auroch has dimensions and proportions similar to that of the Middle Pleistocene. The small size of these specimens could therefore be attributable also to a selection made by human beings according to their dietary and/or hunting preferences.

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