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Concerning the extinction of the wild horse in Italy and the newly introduction as domesticate: recent evidence from Grotta dei Cervi - Porto Badisco (Otranto, south Italy)

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***Abstract* – The radiocarbon dates of some equid remains coming from Grotta dei Cervi - Porto Badisco (Otranto, Apulia, south Italy) - that was for a long time frequented in the Prehistory are here presented. The occurrence of wild equids and the new introduction as domesticate in Italy in Prehistorical time has been the subject of intense debate for years. Until a few years ago, wild equids were thought to be extinct at the end of Pleistocene, not surviving after the last glacial period. The discovery from Grotta delle Mura, south Italy, had already questioned the period when the extinction of these species occurred. The 14C dates of the equid remains from Grotta dei Cervi aim at a better understanding of the dynamics of equid extinction and new introduction in Italy. They contribute to discuss on the last presence of equids in south Italy at least until the beginning of the Atlantic.**

I. INTRODUCTION

In this paper the radiocarbon dates of some equid remains coming from Grotta dei Cervi - Porto Badisco (Otranto, Apulia, south Italy) - that was for a long time frequented in Prehistorical time are presented.

The occurrence of wild equids and the introduction of horse in Italy has been the subject of intense debate for years. Until a few years ago, wild equids were thought to be extinct at the end of Pleistocene, not surviving after the last glacial period. The reasons were seen in a likely excessive predation by man and the concomitant change of environment that certainly did not favor their survivals.

II. THE CONTEXT

Grotta dei Cervi is a coastal natural cave, located along the Salento coast, in southern Italy, near Porto Badisco and 6 km to south of Otranto.

Grotta dei Cervi has been defined since its discovery as the most important post-Palaeolithic art monument in the Mediterranean. On the cave walls there are hundreds of red painted, seldom overlapping one on each other, and brown motifs depicting hunting and sociality scenes alongside with abstract symbols like spirals, S and concentric circles [1].

The cave has five entrances (A-E), opening on the same number of cavities from which three labyrinthine

corridors extend for tens of meters in depth (from 20 and 28) and for a length of 200 m (fig. 1).

The first investigations date back to the years 1970-71 and 1975 and were carried out by the then Superintendent to the Antiquities F. G. Lo Porto. The study of ceramic materials from the 1970-71 excavations in the A-D-E Cavities allowed to define the long-standing cave occupation in the Holocene, starting with the early Neolithic (as demonstrated by impressed wares), uninterruptedly in the 6th (with painted wares) and 5th millennium BC (with Serra d'Alto and Diana wares). The occupation continued during the Copper Age (as evidenced by Piano Conte, Gaudo, Rinaldone and Laterza styles), the middle (19th-14th century BC) and the final Bronze Age (11th-10th century BC).

Its central role as a Mediterranean sanctuary is witnessed by the presence of exogenous raw materials (cinnabar and bitumen), symbolic artefacts (pintaderas, rhyta and anthropomorphic recipients) and ceramic productions recalling cultures documented in Sicily, Eastern Adriatic and Greece [2].

The cavities A and D were occupied, however, already from the Upper Palaeolithic (40/35,000 to 10,000 BP), as evidenced by "Late Gravettian" and Epigravettian lithic industry found in Cavity A [3] and "Romanellian" lithic industry in the entrance D. [4]

The radiocarbon dates presented in this paper refer to some equids remains coming from Cavity B and recovered during the 1975 excavation. The deposit can be described as following: [5]

Layer 1: Filling above soft and sandy black soil, formed after the abandonment of the cavity by supply of the meteoric water: from the entrance it continues for a dozen meters within the cave;

Layer 2: Compact black ground with fireplaces, Copper Age wares and burials under stones;

Layer 3: Ceramic level with Serra d' Alto and Diana styles;

Layer 4: Ceramic layer with impressed, scratched, and painted wares.

The reading of the 1975 excavation diary written by Lo Porto allowed to highlight the presence on an additional reddish sandy layer (layer 5), which lays directly on the base rock and represents "*il più antico livello di frequentazione da parte dell'Uomo*" (the oldest level of occupation by Man).

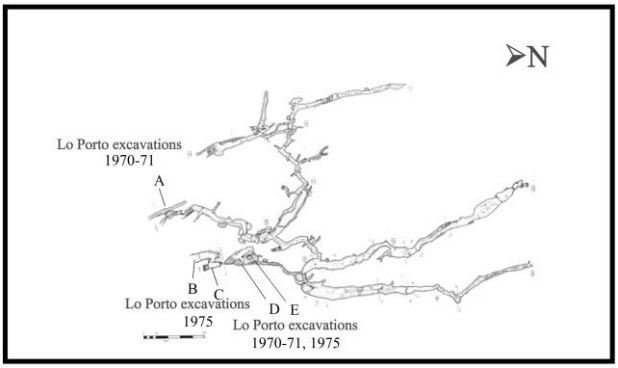

Fig. 1. Grotta dei Cervi - Porto Badisco: map of the cave.

III. MATERIAL AND METHOD

Eleven horse samples have been selected for AMS (Accelerator Mass Spectrometry) radiocarbon dating from the Cavity B of Grotta dei Cervi. For the chemical processing of bone samples, the Longin method was used to extract the collagen fraction. [6] First, the samples were cleaned mechanically by removing extraneous adherent particles and crushed to powder by using pestle and mortar. Second, they were treated with acetone, rinsed with deionized water and subsequently treated with 1% HCl to remove the inorganic bone component; gelatinized in water at 85 °C at pH = 3. The non-soluble fraction was finally filtered using a 0.45-μm pore silver filters. The purified collagen gelatine was then combusted to CO2 in sealed quartz tube and reduced to graphite at 600 °C by using H2 as the reducing medium and iron powder as the catalyst. Finally, the obtained graphite was pressed in the aluminium target holders of the accelerator mass spectrometers.

The AMS radiocarbon dating was carried out at AMS beamline of CEDAD (CEnter for DAting and Diagnostics, Italy) by using a 3 MV Tandetron accelerator (Mod. HVEE 4130 HC). [7]

IV. RESULTS

The measured radiocarbon ages were calibrated to calendar ages by using the software OxCal v4.2 [8] and the last internationally accepted calibration curve based on atmospheric data INTACAL13 by Reimer P.J. et al.. [9] The results shown in Figures 2 and 3 indicate that absolute ages span from 31,000 to cal. 8,000 BC.

V. DISCUSSION

The discovery of several wild horse and ass remains from layer 2 at Grotta delle Mura (Monopoli, Apulia,

south Italy), dated to 8290 +/- 50 BP (UTC 1417) and to 8240 +/- 120 BP (UTC 780), had already questioned the period when the extinction of these species occurred. [10]

In the Neolithic (6th-5th millennium BC) there are no traces of horse in Italy. No site has returned remains of equids and as far as the Copper Age (4th-3rd millennium BC) is concerned, the reports of the presence of horse in Italy are very rare (e.g. at Querciola near Florence and at Maccarese "Fianello" near Rome). [11] [12]

This is likely to represent the first introduction of domestic horse in Italy, although it does not seem to lead to an immediate widespread of these animals, as the horse is practically absent in the early Bronze Age. The reporting of equine remains from Early Bronze age sites concerns mostly settlements, such as Barche di Solferino (Mantua, Lombardy, north Italy), where the material are also mixed with Middle Bronze Age pottery, so the real presence of this animal must still be demonstrated. The discovery of a mandible from the final phase of Early Bronze Age (II phase, ca. 1800-1620 BC) at Lavagnone (Desenzano del Garda, Lombardy, north Italy) represents a *terminus post quem* of a likely second wave of horse introduction to Italy. [13]

The horse spreads out from the beginning of the Middle Bronze Age (17th-16th c. BC), together with the appearance of deer antler bit and chariot wheels, and later in the Late Bronze Age (13th-12th c. BC), with the occurrence of long downward swords, the use of which could also be justified for a man riding a wagon.

In this scenario are now placed the radiocarbon dates of the equid remains coming from Grotta dei Cervi, aimed at a better understanding of the dynamics of horse introduction and diffusion in Italy.

The equid remains come from different layers and areas of the Cavity B, mostly associated to domestic fauna that is typical of the Neolithic and Copper Age periods.

From layer 5 comes the specimen LTL 16849A dated to 31,863-30,662 BC, that documents an attendance of the cave during the early phase of the Upper Paleolithic. By removing the lower layers 4 and 5 the specimen LTL 16851A dating to 16,746-16,232 BC was found, suggesting the existence of a level referable to the final phase of the Upper Paleolithic.

Even to the Upper Paleolithic refers three specimens (LTL 16850A, dated to 29,430-28,815 BC, LTL16847A dated to 26,415-25,751 BC and LTL16842A dated to 22,302-21,722 BC) coming from layer 3, surely from an area that was disturbed in antiquity.

Other specimens - LTL 16839A (17.261-16.796 BC), LTL 16846A (11. 442-11.131 BC) and LTL 16838A (29.498-28.972 BC) - come from layer 1 and a part of the disturbed deposit found into the Cavity, as Lo Porto recognizes when refers it to the action of the meteoric waters.

Finally, the specimens LTL 16843A (19,318-18,727 BC), LTL 16844A (18,679-17,920 BC) and LTL16845A (8,224-7,756 BC) were found between the vault collapse blocks during the removal of the earth that obstructed the cavity B.

This last date is of particular importance because it further enhances the presence of equids in Salento (Apulia, south Italy) at least until the end of the Boreal Age or at the beginning of the Atlantic. The last one, characterized by a general rise in temperature, is known to have an ever-growing forest that was certainly detrimental to the survival of the last wild horses. In fact, the ideal habitat for horse is the prairie and not the forest.

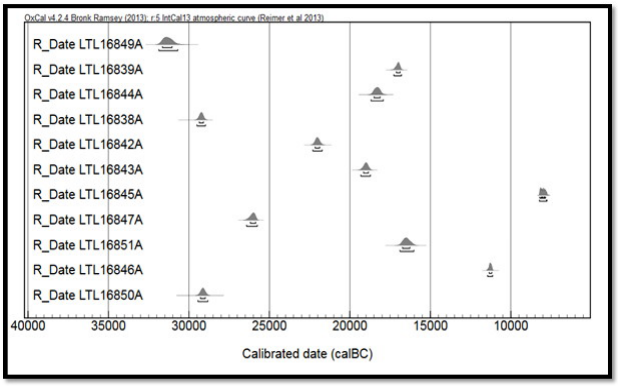

Fig. 2. Grotta dei Cervi - Porto Badisco: 11 ^{14}C dated samples with relative calibration curves.

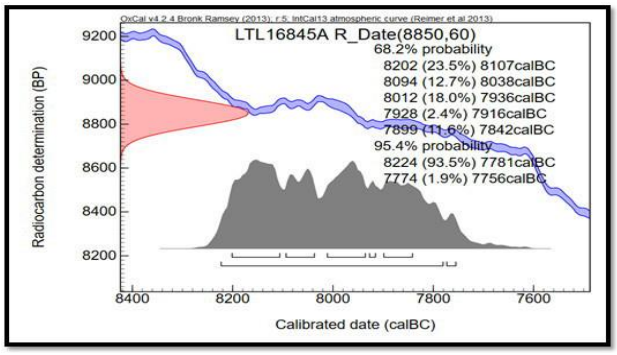

Fig. 3. Grotta dei Cervi - Porto Badisco: Calibrated 14C date of sample LTL 16845.

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