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A JUVENILE RHINOCEROTIDAE NEUROCRANIUM FROM THE MIDDLE-LATE PLEISTOCENE SITE OF MELPIGNANO (APULIA, ITALY): CT-SCAN ANALISYS AND VIRTUAL RESTORATION.

Jacopo CONTI[1,2], Federico CIAVATTA[1,2], Dawid A. IURINO[1,2], Beniamino MECOZZI[1,2], Raffaele SARDELLA[1,2]

1 Dipartimento di Scienze della Terra, Sapienza Università di Roma, P.le Aldo Moro, 5, 00185, Roma
2 PaleoFactory, Sapienza Università di Roma, P.le Aldo Moro, 5, 00185, Roma

Here we presents the preliminary analysis performed on the fragmentary neurocranium and its natural endocast referable to a juvanile Rhinocerothidae from Melpignano-Cursi area (Lecce, Apulia, Southern Italy) (Fig.1).
During the Middle-Late Pleistocene, the Miocene calcarenite was affected by an intense karst activity that formed sub-vertical or funnel-shaped kars fissures, locally so-called «Ventarole».
These fissures were filled with "Terre rosse" in the lower part, and "Terre brune" in the upper part (De Lorentis, 1958-1960).
In 1990s, during a field survey in the «Ventarole» complex, the researchers of Sapienza, University of Rome discovered a fragmentary neurocranium referable to the genus *Stephanorhinus*.
The faunal assemblage recorded into the «Terre rosse» was biochronologically referred to the beginning of Late Pleistocene, while those from the «Terre brune» has been referred to the Late Pleistocene - earliest Holocene (Di stefano et al., 1992; Bologna et al., 1994; Petronio & Pandolfi, 2008, Pandolfi et al., 2017).

Fig. 1 Locationing of the Melpignano-Cursi area

The specimens is rapresent by a several fragments of variable dimension (about 25) that togheter represent the neurocranium of the individual and one natural endocast formd by the diagenesis of the sediments that filled the brain case (Fig. 2).

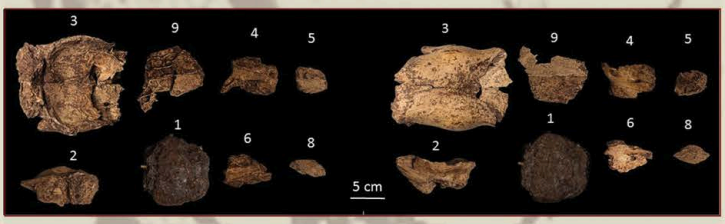

Fig 2. The biggest fragments of the specimens here analysed: 1) natural endocast, 2) right temporal, 3) neurocranium, 4) 5) 6) sphenoid bone, 8) fragments of left temporal. On the left the ventral view, on the right the dorsal view.

Due to the fragmentary and the fragility of the specimen, the indispensable analysis for this work was carried out by an investigation through CT scanning technology; the CT imaging was carried out with a slice thickness of 0.8 mm, and the captured data were processed using OsiriX 3.4.
At the first this kind of analysis allowed us to study the bones density (Fig. 3a) andthe morfology of the cranial suture (Fig. 3b).
As shown in Fig. 3a the bone density of the neurocranium is generally low, this suggest that the specimen belong to a juvanile individual.
This process allows to discriminate and virtually separate the fossilized portion from the sediment, avoiding an invasive procedure that could damage the specimen.

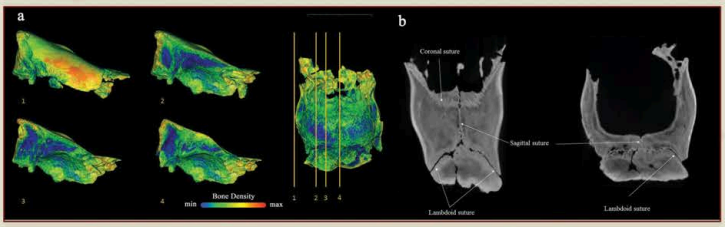

Fig. 3. On the left: Density analysis, on the right: slice withe the cranial suture

These analysis allowed us to make a virtual recovery and to highlight some different cranial bone of the neurocranium (Fig. 4).
After the scansion and the creation of the 3D model of each of the 8 major fragments (Fig. 4 number 2 to 9) and the 3D model of the natural endocast (Fig. 4 number 1) we repositioned all the pieces where they belong in accordance with their original anatomical position.

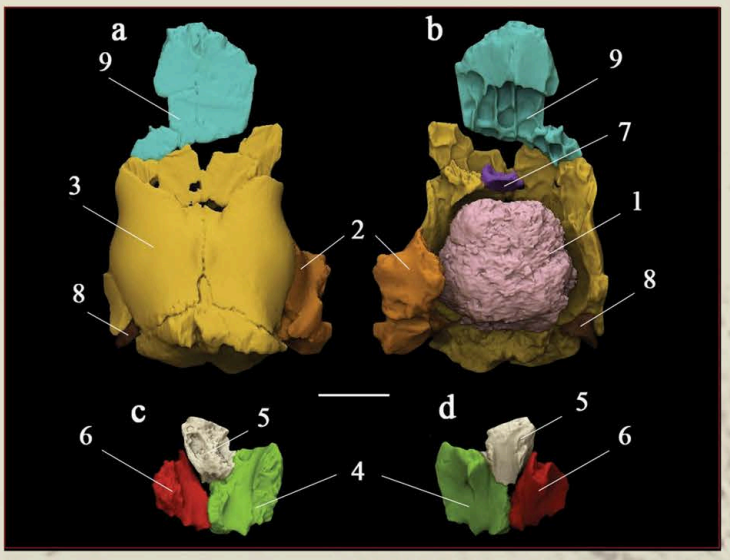

Fig. 4. Restored 3D model of the neurocranium: a - c dorsal view; b - d ventral; the numeration is the same of the Fig. 1 (scale bar 5 cm).

Also, we had analysed the CT scan of the endocast.
From this analysis came out that into the sediments there are embedded few micromammals and birds bones. (Fig. 5 a,b,c).
We, also, compared the 3D model from the natural endocast with the 3D model of the cranial cavity of the original neurocranium (Fig. 5 e,f).

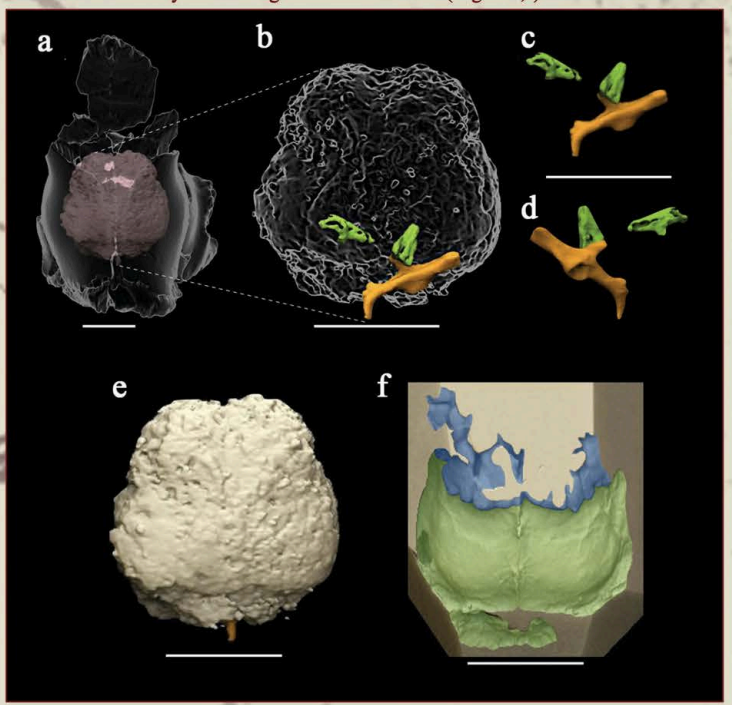

Fig. 5. Results of the analysis of the CT scan of natural endocast (scale bars 5 cm): a - 3D reconstruction of the natural endocast in its original position into the neurocranium; b - enlarged 3D model of the natural endocast with highlighted microvertebrates bones; c - microvertebrates bons without the volume of natural endocast; d - ventral view of microvertebrates bones; e - 3D model of the natural endocast surface; f - 3D model of the volume of the cranial cavity (green) and of the pneumatic cavities (light blue).

The specimen was attributed to the genus *Stephanorhinus* because its age and the bad state of preservation make impossible a taxonomic attribution at specific level. The informations obtained from the overall size of the specimen and the sutures development, indicate that this is one of the youngest fossil rhinoceros ever found in Italy. The preliminary results of this work indicate how it is possible to restore and study in detail different anatomical, taxonomic and tafonomic aspects even in fragmentary and problematic vertebrate fossils.

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