



SYSTEMATIC REVISION OF HIPPOPOTAMID REMAINS FROM THE CASINO BASIN, TUSCANY, ITALY

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BULLET-POINTS ABSTRACT

- Pantanelli (1879) described hippopotamid remains from the Casino basin.
- Joleaud (1920) ascribed the remains to the new species *Hex. pantanellii*.
- Boisserie (2005) dubiously attributed the material to the genus *Hexaprotodon?*.
- The remains collected from the Casino basin are scarce and not diagnostic.
- The specimens should be, more prudently, assigned to Hippopotamidae indet.

KEYWORDS:

Late Miocene;
Casino basin;
Hippopotamidae.

INTRODUCTION

The history of the family Hippopotamidae is far to be completely understood. Hippopotamids abruptly appeared in the fossil record around 7.5 Ma (Boisserie, 2007). The first migration of Hippopotamidae outside Africa took place around 6 Ma (Boisserie, 2007). In Europe hippopotamids remains were collected from the Late Miocene deposits of Spain and Italy. In Italy two different Late Miocene species were recognized: *Hexaprotodon? pantanellii* from Tuscany (Pantanelli, 1879) and *Hex.? siculus* from Sicily (Seguenza, 1902; 1907).

MATERIALS AND METHOD

The remains of *Hexaprotodon? pantanellii* were collected during the 19th century from the Casino Basin, Siena. Pantanelli (1879) described some hippopotamid remains that he attributed to *Hippopotamus hipponensis*, (*Hex.? hipponensis* in Boisserie, 2005), a pigmy hippopotamid species from Algeria that was firstly described by Gaudry in 1876. Unfortunately, the specimens collected at Casino were particularly scarce. These remains consisted of a mandibular symphysis fragment with four broken incisors (i1 left, i1 right, i2 right, i3 right), some isolated incisors, a broken second lower premolar, a second lower molar and a fragment of a lower canine. Joleaud (1920) assigned these remains to a new species: *Hex. pantanellii* (*Hex.? pantanellii* in Boisserie, 2005). According to Joleaud (1920), the mandibular fragment with four incisors suggest the hexaprotodont condition in this Italian Late Miocene species. The hexaprotodont condition is more archaic than the tetraprotodont one. Joleaud (1920) never saw the original material from Casino and he only worked

on the Pantanelli's plates and descriptions. A revision of the Casino Basin material currently stored at Museo di Storia Naturale, Accademia dei Fisiocritici at Siena, revealed that the illustrations reported by Pantanelli in 1879 did not perfectly resemble the real specimens. A reconsideration of these original remains, morphologically and morphometrically, could shed light on these poorly known material from Tuscany.

DISCUSSION

The overall morphology is oversimplified in the Pantanelli's plates. The incisors are not perfectly round in section, but transversally compressed (Fig. 1). In addition, the morphometric values of the incisors were underestimated. The values that can be derived from Pantanelli's plates for the two first incisors are: 21.6 and 18.3 mm respectively for transversal diameter and 21.4 and 21.4 mm for labio-lingual diameter. In contrast, our measures taken on the original revised specimens kept in Siena Museum are: 20 and 21.4 mm for transversal diameter and 26 and 25.7 mm for labio-lingual diameter. The lower incisors are larger than those figured by Pantanelli. The mandibular fragment is also characterized by the presence of lignite veins (black veins on Fig. 1) that testify the possible action of taphonomic processes affecting the shape of the specimen. Indeed, the action of diagenesis could have altered the true morphology of the lower incisors and the true arrangement of the teeth in the mandibular symphysis.

Joleaud (1920) also noticed that the molar of *Hex.? pantanellii* was characterized by a wear pattern simpler than *Hex.? hipponensis* and modern hippopotamids.

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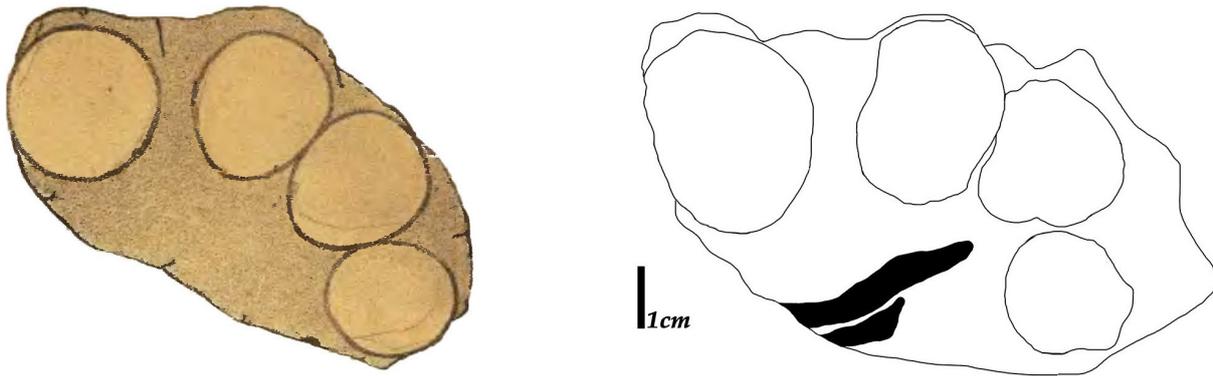


Fig. 1. Illustration made by Pantanelli (1879) on the left and the real morphology of the mandibular fragment, MSNAF2821 collected from the Casino Basin and stored at Accademia dei Fisiocritici at Siena, on the right. Not in scale.

Unfortunately, the lower molar described by [Pantanelli \(1879\)](#) and revised by [Joleaud in 1920](#) went lost. The morphology of the lost molar cannot be considered as diagnostically relevant. The second lower premolar is damaged and it is not characterized by any diagnostic features. The lower canine displays some characteristics that are typical of juvenile specimens of *Hip. amphibius*. The wear surface shows a narrower apical end with a deflection towards the internal side of the tooth. The longitudinal grooves typical of the hippopotamids are not clearly observable while it displays transversal grooves (a character occurring in juvenile specimens of *Hip. amphibius*). It can thus be assumed that this canine probably belonged to a juvenile hippopotamid. Since juvenile specimens in mammals are characterized by features that are different from those of the adult ones, the morphology of the lower canine is not diagnostic. Morphologically the remains collected from the Casino basin are similar to *Hex.? siculus* and *Hex.? crusafonti* ([Aguirre, 1963](#)). *Hex.? crusafonti* inhabited Spain and France during MN13 and MN14. *Hex.? pantanellii* probably arrived through the Iberian Peninsula and colonized Tuscany during the Messinian period. Unfortunately, a real morphological comparison between *Hex.? crusafonti* and *Hex.? pantanellii* is prevented by the scanty record of the Tuscan species.

CONCLUSION

The following considerations can be summarised concerning the hippopotamid remains from the Casino basin:

1. the morphology illustrated by Pantanelli is oversimplified and it does not perfectly resemble the real one;
2. the morphometric values of the lower incisors were underestimated by early authors. The first

lower incisors are both transversally compressed with an elliptic outline and a greater labiolingually diameter;

3. the second lower molar went lost and its original morphology cannot be studied anymore;
4. the lower canine belongs to a juvenile hippopotamid and it is therefore not diagnostic for specific identification.

The available record does not support considering *Hex.? pantanellii* as a valid species, and the specimens from Casino should be, more prudently, assigned to Hippopotamidae indet. However, the occurrence of an hippopotamid in Casino basin it is still very significant. The clear African affinity of this taxon testifies that the Messinian Hippopotamidae dispersal from the North Africa to Europe was widespread enough to reach the Tuscan area.

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