

The rediscovered holotype of *Palaeopython sardus* Portis, 1901 from the Miocene of Sardinia belongs to a fish, not to a snake

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ABSTRACT - Erected on the basis of an incomplete skull bone, *Palaeopython sardus* Portis, 1901 is the only specimen referred to this species. The holotype, from the Middle Miocene of Monte Albu (Sardinia) and identified as the palatine-pterygoid of a snake, was never revised as the specimen had not been traced by the various authors who had discussed the validity of this taxon. The holotype was recently found by the authors in the collections of the Museo Sardo di Geologia e Paleontologia "Domenico Lovisato" (Cagliari, Italy) where it is now housed under accession number MDLCA 14402. The preservational status of MDLCA 14402 does not differ from the description and figures by Portis but according to our revision, it is actually the premaxilla of an undetermined acanthomorph fish. The name *Palaeopython sardus* Portis, 1901 is here considered as a nomen dubium since the holotype is incomplete and on the basis of the preserved features it is not possible to diagnose a fish taxon or to refer the specimen to an extant or extinct species. The booid snakes of Italy are therefore represented only by erycine snakes that so far have been described in localities with an age ranging from the Late Miocene to the Late Pliocene.

RIASSUNTO - [L'olotipo ritrovato di *Palaeopython sardus* Portis, 1901 proveniente dal Miocene della Sardegna appartiene a un pesce, non a un serpente] - Il celebre paleontologo Alessandro Portis descrisse nella sua prolifica carriera anche un certo numero di specie estinte di rettili. Fra questi, il pitone *Palaeopython sardus* Portis, 1901 ha per olotipo un resto cranico, originariamente identificato come una "porzione considerevole del Palato-pterygoideo destro" proveniente dal "Calcere argilloso della base di Monte Albu (Bosa)" in Sardegna (Miocene Medio). Successivamente collocato nel genere *Python*, l'olotipo di questa specie non è più stato revisionato in quanto considerato irrintracciabile. Non sono stati descritti altri resti riferibili a *P. sardus* e la sua validità è stata discussa da numerosi autori sulla base delle informazioni fornite nel lavoro originale di Portis. Grazie al fatto che il tipo è stato recentemente ritrovato nelle collezioni del Museo Sardo di Geologia e Paleontologia "Domenico Lovisato" (Cagliari), è ora possibile aggiornare la descrizione della sua morfologia e valutare la validità del taxon eretto da Portis. MDLCA 14402 non appartiene a un serpente ma è chiaramente un premaxillare ascrivibile ad un pesce indeterminato riferibile al gruppo degli acantomorfi. Poiché l'olotipo non fornisce informazioni sufficienti per diagnosticare una specie, né per riferirlo a un taxon attuale o estinto di teleostei acantomorfi, *Palaeopython sardus* Portis, 1901 viene qui considerato un nomen dubium. *P. sardus* si aggiunge quindi alle numerose specie di rettili cenozoici italiani descritte fra la fine del XIX secolo e l'inizio del XX che si sono rivelate essere nomina vana o sinonimi di taxa attuali. Gli unici booid rinvenuti in Italia sono pertanto i boa delle sabbie appartenenti alla famiglia *Erycinae* che sono stati identificati in alcune località di età compresa fra il Miocene Superiore e il Pliocene Superiore.

INTRODUCTION

Around the end of the 19th and the beginning of the 20th century several Cenozoic extinct species belonging to the extant clades of reptiles were erected by a few Italian researchers that, despite being renowned expert palaeontologists, had only a limited knowledge of the morphology and variation of the skeletal elements of the extant reptiles. As a result, many of the taxa that they described as reptiles, are not reptile at all, or turned out to be junior synonyms of previously described extant or extinct taxa and cannot be considered as valid. Examples are the tortoises *Testudo globosa* Portis, 1890, *T. oriens* Portis, 1890, and *T. seminota* Portis, 1890 that are junior synonyms of the extant *T. hermanni* Gmelin, 1789; the terrapins *Emys latens* Portis, 1890 and *E. major* Portis, 1890 that are junior synonyms of the extant *E. orbicularis* (Linnaeus, 1758); the terrapin *E. parva* Ristori, 1891 that is a junior synonym of *Mauremys campani* (Ristori, 1891); the terrapin *E. depressa* Ristori, 1891 that is a nomen invalidum, being a junior primary homonym of *E. depressa* Merrem,

1820, the extant turtle now called *Phrynops geoffroanus* (Schweigger, 1812); the marine turtle *Pliochelys derelicta* Portis, 1890 that is a nomen vanum and whose type material should be referred to an undetermined cheloniid turtle; the putative varanoid *Progonosaurus pertinax* Portis, 1890 that is another nomen vanum and whose type is actually a fragmentary vertebra of an undetermined marine turtle; the putative crocodylians *Eridanosaurus brambillae* Balsamo-Crivelli, 1864 and *Rhytisodon tuberculatus* Costa, 1854-6 that are respectively based on an undetermined rhinoceros vertebra and a squalodontid odontocete tooth; the tomistomine crocodylian *Tomistoma lyceensis* (Costa, 1848), the crocodile *Crocodylus bambolii* Ristori, 1890, and the snakes *Coluber beggiatoi* De Zigno, 1889, *C. etruriae* Portis, 1890, and *C. omboni* De Zigno, 1889 that are nomina vana being their types non diagnostic (see among others, Kotsakis, 1982; Rage, 1984; Delfino, 2002; Delfino & Szyndlar, 2003; Kotsakis et al., 2004; Piras et al., 2007; Delfino & Rook, 2008; Chesi et al., 2009; Rook et al., 2013; see Sanchiz, 1998, for the meaning of the descriptive term nomen vanum).

In the present contribution we focus on the revision of the putative snake *Palaeopython sardus* Portis, 1901. According to the literature (Rage, 1984; Delfino, 2002; Szyndlar & Rage, 2003; Schleip & O'Shea, 2010), the only non-erycine Booidea found in Italy is the pythonid *Palaeopython sardus* described by Alessandro Portis in 1901 on the basis of single tooth bearing bone found in the Middle Miocene of Sardinia.

Portis got this remain from Domenico Lovisato, at that time Professor of Geology at the University of Cagliari, and somehow discussed its identification with Francesco Bassani, a renowned fish specialist, who excluded that it was the remain of a fish. The remain was originally associated to the label “mascellina di rettile (forse prossimo agli Sphaenodonti?). Calcare argilloso della base di Monte Albu (Bosa)” (“small maxilla of a reptile [perhaps close to Sphaenodontians]. Clay-rich limestone of the base of Monte Albu [Bosa]”), but Portis identified it as an ophidian palatine joined with an anterior pterygoid fragment (“porzione considerevole del Palato-pterygoideo destro”; Portis, 1901a, p. 249). As noted by Rage (1984, p. 21) the material was referred by Portis to *Palaeopython Rochebrune*, 1880 simply because, “at that time, this genus was the best known among the fossil Boidae” but the referral of the material to this genus was not demonstrated and “the known characters of the holotype do not permit a precise generic assignment”. On the basis of its size and its age, Rage (1984) referred the material - with doubt - to the genus *Python*, because it is the only known large boid snake that inhabited Europe during the Neogene. As for the specific identification, Portis simply wrote that being the material not comparable to any species already known, it was necessary to erect a new species, *Palaeopython sardus*. Following the short original description and the poor figure, Rage & Augé (1993) questioned the referral of this species to the genus *Python*, whereas Szyndlar & Rage (2003) considered *Palaeopython sardus* a nomen dubium as it is indistinguishable from other (extinct) *Python*.

The morphological identification of the fossil remain proposed by Portis was later accepted by Rage (1984), Delfino (2002), Szyndlar & Rage (2003), and Schleip

& O'Shea (2010), but none of these researchers directly examined the specimen that was considered as “not traced”. Since the original description, the type and only known remain of *Palaeopython sardus* was never revised but it was recently found by one of us (GLP) in the collections of the Museo Sardo di Geologia e Paleontologia “Domenico Lovisato”, Cagliari (Italy) where it is now exhibited in the display under the accession number MDLCA 14402. Its preservation status appeared unchanged since its first description more than 110 years ago and this allowed us to re-describe it and re-evaluate its taxonomic identification on the basis of the same morphological elements that were available to Portis. However, residues of the including matrix have been removed using a vibro-tool and needles.

SYSTEMATIC PALAEONTOLOGY

Subdivision TELEOSTEI sensu Patterson & Rosen, 1977

Section CTENOSQUAMATA Rosen, 1973

Subsection ACANTHOMORPHA Rosen, 1973

Acanthomorpha indet.
(Fig. 1)

1901 *Paleopython sardus* PORTIS, p. 253, unnumbered fig. on p. 249.

1939 *Paleopython sardus* PORTIS - KUHN, p. 97.

1959 *Paleopython sardus* PORTIS, 1901 - COMASCHI CARIA, p. 38-39.

1963 *Paleryx sardus* (PORTIS) - KUHN, p. 14.

1984 ?*Python sardus* (PORTIS) - RAGE, p. 21.

1993 ?*Python sardus* (PORTIS) - RAGE & AUGÉ, p. 204.

1993 *Python sardus* (PORTIS) - SZYNDLAR & SCHLEICH, p. 12.

2002 *Python sardus* (PORTIS) - DELFINO, p. 207.

2003 *Python* sp. - SZYNDLAR & RAGE, p. 72-73, fig. 4.

2010 *Python sardus* (PORTIS) - SCHLEIP & O'SHEA, p. 62.

2013 *Python* sp. - RAGE, p. 529.

Material - MDLCA 14402: left premaxilla (Fig. 1).

Locality - Monte Albu = Monte Alvu (Bosa, Planargia), Sardinia, Italy.

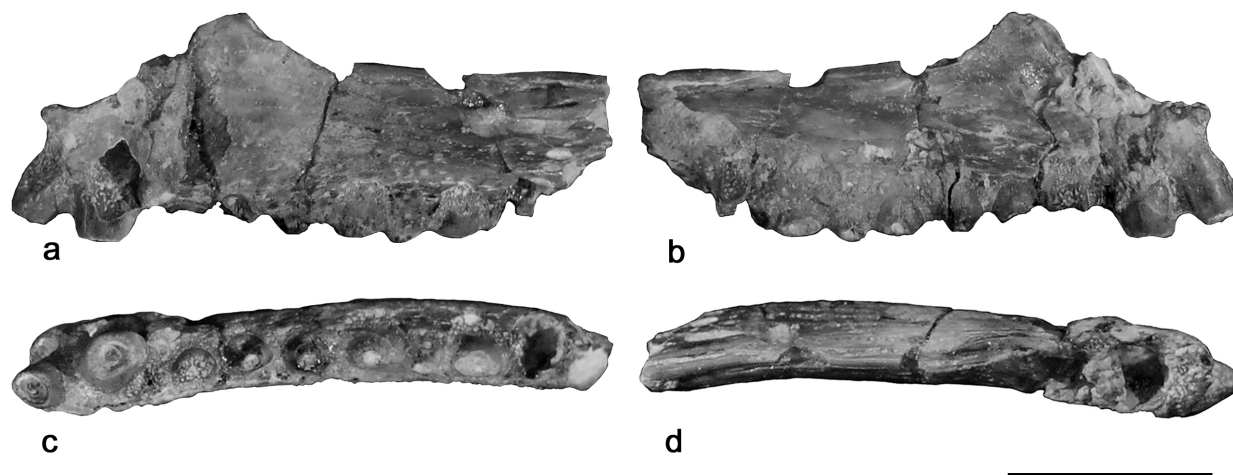


Fig. 1 - The holotype of *Palaeopython sardus* Portis, 1901 (MDLCA 14402), from the Middle Miocene of Sardinia, was originally referred to a snake, but is actually a left premaxilla of an undetermined acanthomorph fish. a, lateral view; b, medial view; c, ventral view; d, dorsal view. Scale bar equals 10 mm.

Age - Middle Miocene, MN 6 or 7+8 (Schleip & O'Shea, 2010).

Description - The specimen has a length of 30.2 mm (rather than 22 as stated by Portis [1901a]), a maximum depth of 11.3 mm, and reaches a maximum width of 4.5 mm. The bone is evidently incomplete, lacking its distal and anterodorsal portions, and appears slightly convex laterally. The bone lateral surface is ornamented by irregular pits and longitudinal shallow striae. A stout dorsal process emerges just posterior to the fragmented anterodorsal corner. It bears a single row of relatively well-spaced teeth. The teeth are roughly rounded in cross section and are exclusively represented by the attachment bone, lacking any trace of dentine or collagen at least along their anterior border. In view of the apparent absence of dentine or collagen along the anterior border of the teeth, it is reasonable to suggest that these are characterized by the Type 4 of tooth attachment (sensu Fink 1981). The two frontal teeth are definitely larger than those following, the first one probably protruded originally. The diameter of the tooth bases varies from 2.0 to about 3.0 mm.

Remarks - The overall morphology of the bone and topographic position of its dorsal process seem to be indicative of a left premaxilla of an acanthomorph fish. In this case, the lacking anterodorsal portion of the bone corresponds to its ascending process while what is described herein as the dorsal process should be interpreted as the articular process. According to Fink (1981), the Type 4 tooth attachment mode is characteristic of the oral jaws of the genus *Esox*, several stomiiforms and a number of eurypterygians, including the aulopiforms, myctophiiforms, polymixiiforms, beryciforms, merlucciids, zeids, lophiiforms, and centropomids. However, the survey of Fink (1981) is largely incomplete and many other percomorphs are certainly characterized by this type of tooth attachment mode.

In summary, the incompleteness and inadequate preservation of the specimen do not allow a more detailed taxonomic analysis for which additional comparative information would be desirable. The overall physiognomy of this isolated bone, as well as the morphology of the teeth are in many ways similar to those of certain acanthomorph fishes (sensu Wiley & Johnson, 2010), such as the merlucciids and the lophiids (e.g., Kerebel et al., 1979; Inada, 1981; Carnevale & Pietsch, 2012). Anyway, it is our opinion that it is not possible to properly identify the specimen until much complete material from the same locality will be available for a comprehensive comparative analysis.

Despite the uncertain taxonomic placement of the bone documented herein, it is possible to conclude that any relationship with the reptilian clade *Serpentes* must be necessarily excluded on the basis, among others, of the structure of the bone (presence of longitudinal shallow striae) and of the tooth insertion.

DISCUSSION AND CONCLUSIONS

The revision of the rediscovered type material of *Palaeopython sardus* Portis, 1901, MDLCA 14402,

allowed us to definitely clarify that the supposed palatine-pterygoid fragment referred to a pythonid snake by several authors during the last century is actually a premaxilla of an undetermined acanthomorph fish. The name *Palaeopython sardus* Portis, 1901 is therefore a nomen dubium because it is not possible to diagnose any fish species on its basis. Further information on the identity of MDLCA 14402, and a confirmation of its putative age, could be indirectly obtained by the location of the fossiliferous outcrop in the "calcere argilloso della base di Monte Albu" and the retrieval of further fish remains. To our best knowledge, this is however the only vertebrate remain so far collected in that area. The new identification of MDLCA 14402 erases the only Italian occurrence of a non-erycine Booidea. In fact, booids are not rare in the Italian fossil record but they are represented only by sand boas (family Erycinae) that have been so far collected in the Late Miocene of Ciabot Cagna (Cavallo et al., 1993), Moncucco Torinese (unpublished data) and Cava Monticino (Delfino, 2002; Delfino & Szyndlar, 2004), and in the Late Pliocene of Capo Mannu (Delfino et al., 2011). As recently summarized by Rage (2013), sand boas were once quite common in the north Mediterranean region (even at relatively high latitudes), but progressively disappeared from western Europe, where the last representatives date back to the transition between MN 15-16 or to the earliest MN 16, and now survive, north of the Mediterranean Sea, only in the Balkan and Anatolian Peninsulas.

Further steps in the revision of the Miocene reptiles from Sardinia will be the study with a modern approach of the soft shelled turtle *Procyclus sardus* Portis, 1901 (Portis, 1901b) and the tomistomine crocodylian *Tomistoma calaritanum* Capellini, 1890 whose types are still available at Museo "Domenico Lovisato" with the collection numbers MDLCA 14007 and MDLCA 148, despite the remarkable damage suffered by the latter, a damage that now renders the type much less informative than when studied by Capellini (1890).

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