

On the Crocodiles of the Western Indian Ocean

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Abstract

The subfossil remains of the crocodiles of Seychelles and Aldabra were examined and the former identified as *Crocodylus porosus*. The Aldabran material is too fragmentary to allow definite identification.

Introduction

Reports of early exploration in Seychelles described crocodiles as one of the most abundant coastal animals in the islands (Jourdain 1609, Grossin 1742, Picault 1743, Du Barré 1762, Rochon 1769, Oger 1771, Malavois 1787, Garneray 1802, Frappaz 1819; quoted in Bradley 1936, Moine 1963). Since their extinction by 1819 (according to Decary; in Bradley 1936) they have been known only in the form of occasional bones and place names (eg. Roche Caiman). The Seychelles population has generally been reported to be the Nile crocodile (*Crocodylus niloticus*) (Bradley 1936, Honneger 1966), which survives today in Africa and Madagascar, but none of the published accounts gives a clear explanation for the basis of this identification. The fragmentary fossil remains from Aldabra have been compared to Nile and African long-snouted (*C. cataphractus*) crocodiles and found to be much closer to the Nile specimens (Arnold 1976), but no further comparisons have been reported.

Given the geographical location of Seychelles the crocodiles colonising the islands must have come from a coastal population that ventured into the open ocean at least occasionally. Nile crocodiles occur on the east African coast and, in prehistoric times, crossed the Mozambique channel to Madagascar. Despite this they are rarely reported to move from the coast into open waters. The mugger or marsh crocodile (*C. palustris*) of India is equally estuarine and coastal and only slightly more geographically removed. The Indopacific or estuarine crocodile (*C. porosus*) does not occur regularly west of Indonesia but is the only species to be truly ocean-going, being reported as crossing large stretches of open water often out

Phelsuma 2 (1993); 54-58

of sight of land. The position of Seychelles means that any of these three species could have colonised the islands. Current identifications are based on the

assumption that as Seychelles is marginally closer to Africa than to India the crocodiles must have had an African origin, and of the African species only *C. niloticus* is at all probable as a colonist.

In order to confirm the identification of the Seychelles species the three skulls in the National Museum, Victoria, Mahé and the material from Mahé and Aldabra in the British Museum (Natural History) were examined and compared to the skulls of several different species in the University Museum of Zoology, Cambridge, England. These comparisons showed that the most similar species were *C. niloticus*, *C. palustris* and *C. porosus*. Additionally *C. robustus*, the extinct Pleistocene species from Madagascar, was used for comparison (specimens in the British Museum (Natural History)).

Results

The main characters of use in distinguishing between *C. niloticus*, *C. palustris* and *C. porosus* were described by Wermuth (1953). Wermuth's key is summarised below, with additional data and the inclusion of *C. robustus* specimens from the British Museum (Natural History):

- 1). Usually without clear preorbital ridges on snout, if present then only as short blunt elevations in front of the eye. The pterygoids are flat. Supra-occipital ridge present.
 - a). Snout pointed and elongated, at least 1.5 times as long as wide. No trace of preorbital ridges. Skull roof slightly concave in older specimens, overhanging the squamosals at the side. Premaxilla-maxilla suture on palate strongly W shaped
C. niloticus
 - b). Snout relatively short & wide, rounded, total length less than 1.5 times basal width. Preorbital ridge short & blunt, extending onto the lachrymals. Skull roof flat in older specimens, not overhanging the squamosals. Premaxilla-maxilla suture weakly W shaped to rectilinear.
C. palustris
- 2). Snout with clear preorbital ridges extending beyond the lachrymals. Palato-ptyergoidal suture angular. The pterygoids are deeply scooped. The supra-occipital ridge is usually absent.
 - a). Preorbital ridge broad, extending onto the lachrymals, converging slightly. There is no raised rim to the internal naris and the squamosal edges are not raised.
C. porosus
 - b). Preorbital ridges broad but not converging. Back edges of squamosal raised into horn-like projections. The rim of the internal naris is raised.
C. robustus

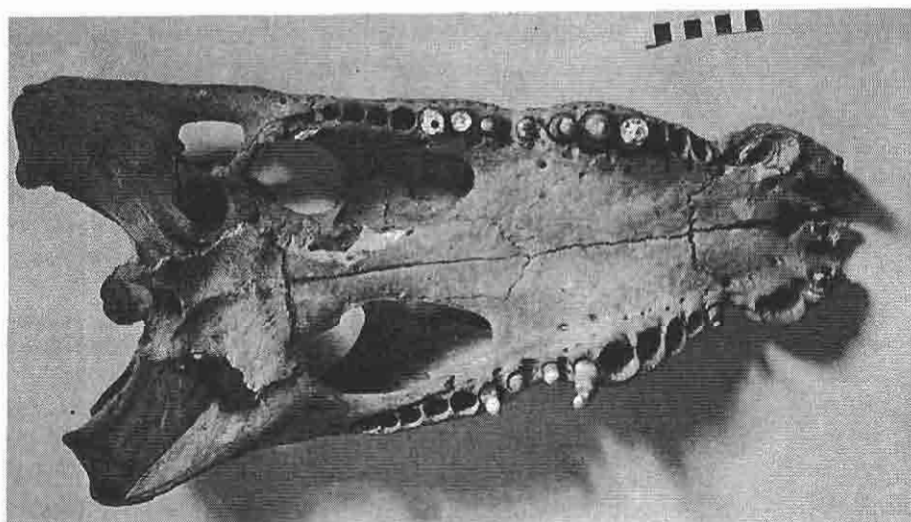
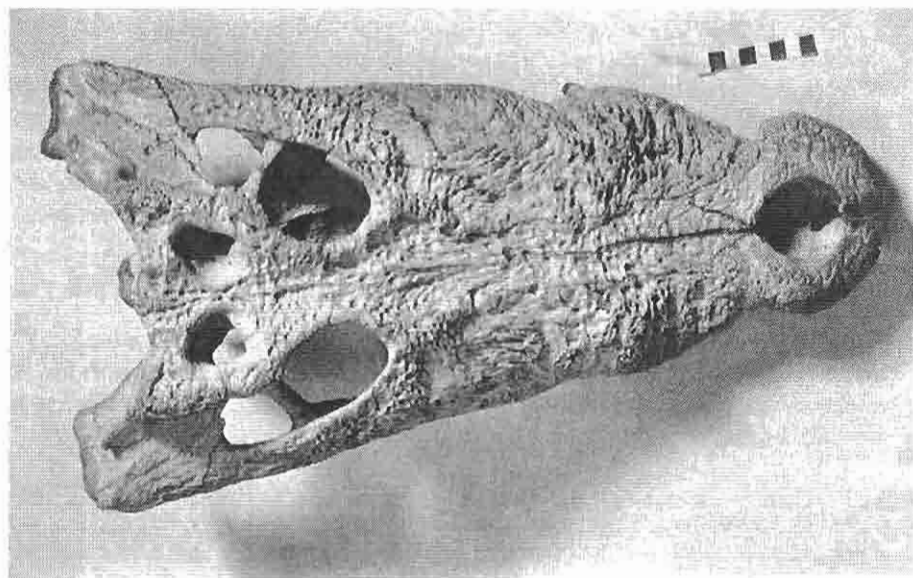


Fig. 1. Seychelles crocodile skull in dorsal and ventral views (S3)

	<i>N</i>	<i>Pal</i>	<i>Por</i>	<i>Rob</i>	S1	S2	S3	R8767-8885
Preorbital ridge	-	-	+	+	+	+	(+)	?
Pterygoid scooped	-	-	+	+	?	?	+	?
Parietal depressed	+	-	+	+	+	+	+	?
Supraoccipital ridge present	-	-	+	-	+	(-)	(-)	?
Palate suture angular	-	+	+	+	?	?	(+)	?
Premax-max. suture W shaped	+	(+)	-	-	?	-	-	?
Squamosal overhung	-	+	-	-	-	-	-	-
Internal naris rim raised	-	-	-	+	-	-	-	?

Discussion

There is considerable variation in the extent and size of the preorbital and supraoccipital ridges but the other characters provide a clear identification of the Mahé specimens (S1-3 & R3226-3230) as *C. porosus*. The Aldabran material (R8767-8885) is far more fragmentary (listed in Appendix 1.) with no diagnostic characters preserved in the cranial material. There is one worn scute which is closest in outline to the rectangular scutes of *C. niloticus* (*C. palustris* being oval and *C. porosus* elliptical). Thus the currently available Aldabran material cannot be satisfactorily identified.

The 1966 photograph of S3 (Honneger 1967) allows a comparison of the state of preservation of the specimens to be made. Since 1966 S3 has deteriorated in several ways, although one tooth has been replaced two teeth in the right upper jaw are now missing. Additionally oxidised glue is now visible in several of the sutures. Examination of the specimens shows that the surfaces of the bones of all three are crumbling. The teeth are also crumbling in S3, and are especially bad in S2. This deterioration is due to fluctuations in temperature and humidity causing stresses within the bones and teeth. With the current means of storage deterioration will continue.

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Appendix 1. List of the Seychelles & Aldabra material examined

(S = Seychelles National Museum, R = British Museum (Natural History))

Specimen	Locality	Material
S1	presumed Mahé	skull
S2	presumed Mahé	skull
S3	presumed Mahé	skull
R3226	Mahé; Anse Royale	2 maxillae, teeth
R3229	Mahé; Anse Royale	2 premaxillae, lower jaw
R3230	Mahé; Anse Royale	1 premaxilla, 2 jugals, lower jaw, 4 teeth
R8767	Aldabra; Pointe Hodoul	right pterygoid
R8768	Aldabra; Pointe Hodoul	left pterygoid
R8769	Aldabra; Pointe Hodoul	right premaxilla
R8770	Aldabra; Pointe Hodoul	right premaxilla
R8771	Aldabra; Pointe Hodoul	left premaxilla
R8783	Aldabra; Pointe Hodoul	vertebra
R8784	Aldabra; Pointe Hodoul	frontal
R8785	Aldabra; Pointe Hodoul	frontal fragment
R8786	Aldabra; Pointe Hodoul	frontal fragment
R8787	Aldabra; Pointe Hodoul	left ectopterygoid
R8788	Aldabra; Pointe Hodoul	left ectopterygoid
R8789	Aldabra; Pointe Hodoul	right ectopterygoid
R8790	Aldabra; Pointe Hodoul	right squamosal
R8791	Aldabra; Pointe Hodoul	right squamosal
R8792	Aldabra; Pointe Hodoul	right squamosal
R8795	Aldabra; Pointe Hodoul	miscellaneous fragments
R8793	Aldabra; Pointe Hodoul	left squamosal
R8796	Aldabra; Pointe Hodoul	dentary fragment
R8885	Aldabra; Bassin Cabris	tooth