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LONG-BEAKED AND SHORT -BEAKED COMMON DOLPHINS SYMPATRIC OFF CENTRAL-WEST AFRICA

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ABSTRACT

Sympatric occurrence of *Delphinus capensis* and *D. delphis* is demonstrated for Gabon and Angola based on cranial evidence. As in eastern Pacific common dolphins, key characteristics include cranial size, rostrum length relative to zygomatic width and tooth width. Two phenotypes of the proximal part of the palatinal ridge are found to be discriminatory between both *Delphinus* species.

INTRODUCTION

Common dolphins represent one of the most widely distributed small cetaceans as they are found world-wide in temperate, tropical, and subtropical seas (Evans, 1994), yet their taxonomy is not quite settled. Heyning and Perrin (1994) presented convincing morphological evidence for the sympatric occurrence of two distinct species of common dolphin in the eastern North Pacific: the short-beaked *Delphinus delphis* (Linnaeus 1758) and the long-beaked common dolphin *Delphinus capensis* Gray 1828. Besides rostrum length, these dolphins differ in body size, tooth width and colouration (Heyning and Perrin, 1994). The two-species concept has met wide acceptance since (IWC, 1995) and is spurring researchers to re-examine in detail *Delphinus* specimens and databases from other parts of the globe. For instance, both *D. capensis* and *D. delphis* were shown to occur in the eastern South Pacific although with considerable geographic variation compared to Californian animals (Van Waerebeek *et al.*, 1994). Captures in coastal fisheries indicate that *D. capensis* is, by far, the most abundant common dolphin in Peruvian shelf waters (Van Waerebeek, 1994).

In maps of 'approximate known distribution' (Heyning and Perrin, 1994: 30-31), *D. delphis* is shown to occur in European seas (except the Baltic Sea) and off NW Africa south to Senegal. *D. capensis* is allotted to a small area between Western Sahara (roughly 22°S) south to approximately northern Senegal and, naturally, in the species' type locality, off the Cape Province, South Africa. Heyning and Perrin (1994) reportedly construed the approximate species' range delineation partly on colouration patterns of common dolphin specimens published by Cadenat (1959). In preparation for a comprehensive UNEP/CMS effort to study (sub)specific status of common dolphins from West African waters, the University of Amsterdam collection was examined. Preliminary insights are reported on here.

MATERIAL AND METHODS

At the Zoological Museum of the University of Amsterdam I examined 21 skulls of common dolphins (Table 1) stranded or caught in territorial waters of four West African nations (Senegal, *N* =12; *Gabon, N* =5; Angola, *N* =3; Congo-Brazzaville, N =1) with the purpose to assign these to species. *Delphinus* skulls are readily distinguished from other delphinids by the two deep lateral grooves in the maxillary ridge of the bony palate (Schlegel, 1841; True, 1889).

Cranial growth has hardly been studied in *Delphinus*, but rostral distal fusion alone in male *D. delphis* is not considered an adequate criterium for physical adulthood (Perrin and Heyning, 1993). I scored the degree of bony fusion (none, moderate or advanced) in seven cranial sutures following Van Waerebeek (1993). Pending specific criteria, I considered 12 skulls with advanced fusion both over more than 2/3 length of the premaxillary-maxillary suture and of the frontal

supraoccipital suture as cranially adult. The latter trait was strongly linked to sexual maturity in the dusky dolphin *Lagenorhynchus obscurus* (see Van Waerebeek, 1993). Six adult-sized skulls, though with bony fusion insufficient to qualify for adult status, were classified as sub adult. Three juvenile specimens were noticeably smaller than the rest and showed no or limited fusion.

RESULTS AND DISCUSSION

The general habitus of two fully adult, almost identical skulls, one from Gabon (ZMA 14594) and another from Angola (ZMA 15236) clearly stood out from the 16 other adult and subadult skulls through a combination of their small size, short rostrum, narrow teeth and a distinct shape of the bony palate:

(1) Condylobasal length of 423mm (ZMA 14594, 15236) *versus* 442-475mm (other adults and subadults)
(2) Rostrum length to zygomatic width ratio = 1.49 (both)
versus 1.56 -1.68 (9 adults)
versus 1.53 -1.64 (9 subadult and immature specimens whose rostrum on average should be expected to elongate in growth, see Perrin and Heyning, 1993).
(3) The mean transverse tooth width at mid-length of the mandibula, at base, in the two short rostrum crania was 3.6mm and 3.9mm, compared to 4.1 - 5.0mm (mean 4.4mm, *N* =11) in the long-rostrum skulls.
(4) Two discrete phenotypes exist of the proximal part of the bony palate, composed of the palatinum (palatine bones) and the proximal maxillary ridge:

> *Lanceolate palate* (long-rostrum specimens, Fig. l): Marked lateral constrictions in the palatinum give the proximal part of the palatinal ridge a lanceolate appearance. Most often (but not always) the palatine processes of the maxillaries also narrow, immediately anterior of the palatine bones, emphasizing the constriction and the lanceolate aspect.
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> *Trapezoid palate* (short-rostrum specimens, Fig. 2): Lateral constrictions in the palatinum are absent [in ZMA 14594, 15236] or very shallow at most [in skulls not discussed here]. Typically the lateral borders of the palatinal ridge steadily diverge in caudal direction; thus with the greatest width at its base, the proximal part of the palatinal ridge is trapezoid in shape.

Although the sample was not gender-stratified (sexes were unknown), the limited sexual dimorphism found in *Delphinus* craniometrics (Heyning and Perrin 1994; Van Waerebeek *et al.,* 1994) could not explain the extent of the described variation. The fact that the long-rostrum skulls from Gabon and Angola were indistinguishable from the long-rostrum skulls from Senegal argues against a geographic variation factor. Features # 1-3 however fit very well the distinctive cranial characteristics defined for *D. delphis* and *D. capensis* from the eastern Pacific (Heyning and Perrin, 1994; Van Waerebeek *et al.*, 1994, unpublished data). Therefore I assign short-beaked and long-beaked skulls to these respective species.
Feature #4 is consistent with observations at skulls of short-beaked and long-beaked common dolphins from Peru (Van Waerebeek, unpublished data; Figs. 1, 2) and, perhaps, also from California (see Evans 1994: fig. 10; Heyning and Perrin 1994: figs. 17, 18). It is proposed that the shape of the bony palate is highly discriminatory to help distinguish cranial specimens of *D. delphis* from *D. capensis.* I conclude that both common dolphin species are sympatric along the Atlantic coasts of central Africa, at least from Mayoumba, Gabon, south to central Angola. Also, *D. capensis* is documented for the first time for Congo-Brazzaville.
In Senegal the common dolphin (nominal *D. delphis)* was the most frequently captured delphinid in the 1950s (Cadenat, 1959). The present sample of 12 skulls from Senegal all belong to the

long-beaked *D. capensis*, however preliminary results from a recently initiated study of *Delphinus* population structure from western Africa confirmed the presence of *D. delphis* off Senegal (Van Waerebeek *et al.*, unpublished data). The higher prevalence of *D. capensis* in present samples derived from strandings and by-catches may reflect a coastal habitat as is known from the eastern Pacific and is not necessarily an indication of greater abundance than the usually more pelagic *D. delphis.* Both *Delphinus* species probably are distributed throughout waters off West and central-west Africa but this hypothesis remains to be tested.

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REFERENCES

Cadenat, J. 1959. Rapport sur les petits cetaces ouest-africains. *Bulletin de l'IFAN*. 21, ser. A.,no.4: 1367-1409.

Evans, W.E. 1994. Common dolphin, white-bellied porpoise *Delphinus delphis* Linnaeus, 1758. pp.191-224. In: S.H.Ridgway and R.Harrison. Handbook of Marine Mammals. Vol.5.

Heyning, J.E. and Perrin, W.F. 1994. Evidence for two species of common dolphins (Genus Delphinus) from the eastern North Pacific. *Contributions in Science* 442: 1-35

International Whaling Commission. 1995. Annex G. Report of the sub-committee on small cetaceans. *Rep. int. Whal. Commn.* 45.

Perrin, W.F. and J.E. Heyning. 1993. Rostral fusion as a criterion of cranial maturity in the common dolphin *Delphinus delphis. Marine Mammal Science* 9(2): 195-197.

Schlegel, H. 1841. Abhandlungen aus dem Gebiete der Zoologie und Vergleichende Anatomie. I. Beitrage zur Charakteristik der Cetaceen. A. Arnz & Compo Leiden. 44pp.

True, F. W. 1889. A review of the family Delphinidae. *Bulletin of the United States National Museum* 36, Washington. 191 pp.

Van Waerebeek, K. 1993. Geographic variation and sexual dimorphism in the skull of the dusky dolphin, *Lagenorhynchus obscurus* (Gray, 1828). *Fishery Bulletin* 91: 754-774.

Van Waerebeek, K. 1994. A note on the status of the dusky dolphins *(Lagenorhynchus obscurus)* off Peru. *Rep. Int. Whal. Commn. (Special Issue* 15) :525-527.

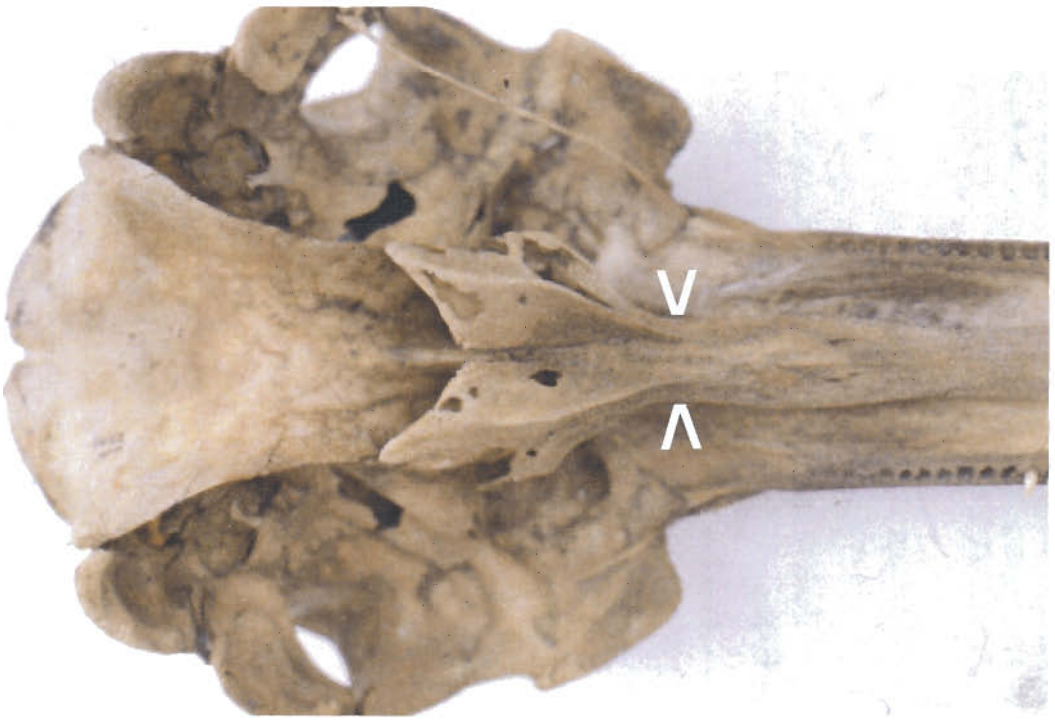
Van Waerebeek, K., Van Bressem, M.F., Reyes, J.C., Garcia-Godos, A., Alfaro, J., Onton, K., Bello, R. and Echegaray, M. 1994. Illegal exploitation of small cetaceans in Peru. Final Report to United Nations Environment Programme, Nairobi, and Whale and Dolphin Conservation Society, Bath, UK. 76pp.

Figure 1. Ventral view of *Delphinus capensis* skull (KVW-2399, CEPEC, Peru). Note lanceolate-shaped palatinal ridge due to lateral constrictions at base.

Figure 2. Ventral view of *Delphinus delphis* .skull (JSM-010, CEPEC, Peru). Note the trapezoid-shaped palatinal ridge without lateral constrictions.

CAT.NO.	LOCALITY	COUNTRY	DATE	PRE-MX	FROC	CRA.MAT	CBL	RL	ZYW	RL/ZW	TW	PAL
Delphinus capensis												
ZMA 13233	Off Dakar	Senegal	-	2 (full)	2	adult	475	308	186	1.66	4.2	Lanceolate
ZMA 13231	Off Dakar	Senegal	-	2 (full)	2	adult	471	306	189	1.62	5.0	Lanceolate
ZMA 13232	Off Dakar	Senegal	-	2 (full)	2	adult	471	302	193	1.56	-	Lanceolate
ZMA 13230	Off Dakar	Senegal	-	2 (2/3L)	2	adult	>470	~30	193	~1.60	4.5	Lanceolate
ZMA 13234	Off Dakar	Senegal	-	2 (full)	2	adult	470	311	-	-	4.4	Lanceolate
ZMA 13243	Off Dakar	Senegal	-	2 (full)	2	adult	469	307	183	1.68	4.3	Lanceolate
ZMA 14.593	Mayoumba	Gabon	Nov 1970	2 (1/2L)	1	subad	468	302	184	1.64	4.2	Lanceolate
ZMA 15.523	01 50'S 09 05'E	Gabon	18 Aug 1972	2 (2/3L)	2	adult	BR	302	182	1.66	4.6	Lanceolate
ZMA 15.524	Off Pointe-Noire	Congo	14 Apr 1972	2 (3/4L)	1	subad	463	299	183	1.63	-	Lanceolate
ZMA 13242	Off Dakar	Senegal	-	2 (full)	2	adult	461	295	183	1.61	4.6	Lanceolate
ZMA 14.592	Porto Amboim	Angola	Nov 1970	2 (1/2L)	-	subad	460	289	181	1.60	-	Lanceolate
ZMA 13240	Yenn, Dakar	Senegal	-	2 (full)	2	adult	458	294	189	1.56	4.1	Lanceolate
ZMA 15.235	10 S, 13 05'E	Angola	-	2 (3/4L)	1	subad	449	287	186	1.54	4.2	Lanceolate
ZMA 13241	Yenn, Dakar	Senegal	-	2 (1/2L)	0	subad	447	290	181	1.60	-	Lanceolate
ZMA 13244	off Dakar	Senegal	-	2 (full)	2	adult	445	288	177	1.63	-	Lanceolate
ZMA 15522	01 50'S 09 05'E	Gabon	18 Aug 1972	2 (1/3L)	0	subad	442	287	179	1.60	4.4	Lanceolate
ZMA 13239	Yenn, Dakar	Senegal	-	0	0	imm	409	258	160	1.61	-	Lanceolate
ZMA 13245	Yenn, Dakar	Senegal	-	1	0	imm	406	253	165	1.53	-	Lanceolate
ZMA 15521	01 50'S, 09 05'E	Gabon	18 Aug 1972	0	0	imm	405	248	160	1.55	-	Lanceolate
Delphinus delphis												
ZMA 14594	Mayoumba	Gabon	Nov 1970	2 (full)	2	adult	423	265	178	1.49	3.9	Trapezoid
ZMA 15236	10 50'S, 13 15'E	Angola	09 Aug 1971	2 (full)	2	adult	423	262	176	1.49	3.6	Trapezoid

Table 1. Discriminatory cranial characteristics for 19 long-beaked and two short-beaked common dolphins from West and Central-west Africa kept at the Zoological Museum, University of Amsterdam. Abbreviations used: PRE-MX premaxillary-maxillary suture; FROC frontal-occipital suture; CMAT cranial maturity; CBl condylobasal length; Rl rostrum length; ZYW zygomatic width; TW tooth width; PAL shape of palatinal ridge; br broken.



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