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The Cetaceans of Mauritania, West Africa: a concise zoogeographical review with two new species records

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Abstract

The exact number of cetacean species present in Mauritanian waters is unknown. A first overview was published only in 1980, the latest in 1998. Yet, published information remains modest compared to, e.g., neighboring Senegal (first review in 1947). The complex oceanography of Mauritanian waters permits a mixed assemblage of cetacean fauna, with the distribution of both cool temperate and (sub)tropical species. In this review, we use our own observations from strandings, bycatches and vessel-based surveys, as well as published and grey literature, to support an updated inventory of cetaceans of Mauritania. This checklist includes two new authenticated species records: *Kogia sima* (Owen) (Kogiidae) and *Lagenodelphis hosei* Fraser (Delphinidae). *Stenella coeruleoalba* (Meyen) (Delphinidae) is verifiably documented for the first time. Further, a first specimen record of *Stenella longirostris* (Gray) (Delphinidae) is described, as well as second specimen records of *Mesoplodon europaeus* (Gervais) (Ziphiidae), *Steno bredanensis* (G. Cuvier) (Delphinidae) and *Megaptera novaeangliae* (Borowski) (Balaenopteridae). Of 30 reported species, 27 (of six families) are fully supported, while three species lack (accessible) voucher material though probably (P) occur in Mauritania: Balaenopteridae: *Megaptera novaeangliae*, *Balaenoptera musculus* (Linnaeus), *B. borealis* Lesson, *B. omurai* Wada, Oishi and Yamada, *B. acutorostrata* Lacépède, *B. physalus* (Linnaeus) and *B. brydei* Olsen (P); Physeteridae: *Physeter macrocephalus* Linnaeus; Kogiidae: *Kogia sima* (Owen) and *K. breviceps* (de Blainville); Delphinidae: *Sousa teuszii* (Kükenthal), *Tursiops truncatus* (Montague), *Delphinus delphis* Linnaeus, *Stenella frontalis* (G. Cuvier), *Stenella attenuata* (Gray), *Stenella coeruleoalba* (Meyen), *Stenella longirostris* (Gray), *Stenella clymene* (Gray), *Steno bredanensis* (G. Cuvier), *Peponocephala electra* (Gray) (P), *Lagenodelphis hosei* (Fraser), *Grampus griseus* (G. Cuvier), *Globicephala macrorhynchus* Gray, *Globicephala melas* (Traill) (P), *Orcinus orca* (Linnaeus) and *Pseudorca crassidens* (Owen); Ziphiidae: *Ziphius cavirostris* G. Cuvier, *Mesoplodon europaeus* and *Mesoplodon densirostris* (de Blainville); Phocoenidae: *Phocoena phocoena* (Linnaeus). Finally, we report the first case for continental northwest Africa of tattoo skin disease in a stranded *D. delphis*.

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Key words: Bycatches, Canary Current, Cetacea, Mauritania, Northwest Africa, sightings, strandings

Introduction

The Mauritanian coast is considered as one of the most productive oceanic regions in the world (Peña-Izquierdo et al., 2012). It is situated within the Canary Current Large Marine Ecosystem (CCLME), one of four most important eastern boundary currents where upwelling brings nutrient-rich waters to the surface year-round (Valdés and Déniz-González, 2015). This rich and biodiverse ecosystem created by cool upwelling supports one of the biggest fisheries in the world (e.g., Zeeberg et al., 2006). The evident importance of this region for cetaceans and seabirds has been noted by numerous authors (Capone and Hutchins, 2013; Baines and Reichelt, 2014; Camphuysen et al., 2015; Djiba et al., 2015; Russell et al., 2018).

The cetacean fauna of the Mauritanian coast and their natural history are poorly documented (Robineau and Vély, 1998). Moreover, the handful of published studies, based mostly on strandings, are 20–30 years old (e.g., Duguy, 1976; Maigret, 1980; 1981; Smeenk et al., 1992; Robineau and Vély, 1993; 1998; Robineau et al., 1994; Vély et al., 1995). More recently, sightings data opportunistic to research of fisheries resources (Zeeberg et al., 2006; Djiba et al., 2015), a seismic survey (Russell et al., 2018) and several dedicated surveys for marine birds and mammals (Tulp and Leopold, 2004; Van Waerebeek and Jiddou, 2006; Camphuysen et al., 2012; 2015; 2017) were added. Observations at sea and monitoring of strandings were conducted between 2012 and 2016 as part of a major project Biodiversité-Gaz-Pétrole (BGP) in collaboration with the KOSMOS oil company, resulting in a significant amount of new information on cetacean presence in Mauritanian coastal waters. These recent efforts offer an opportunity to critically review former records from multiple sources and allow a much-needed updated overview which may appeal also to a wider, non-specialist public, especially persons contributing to 'citizen science'.

Monitoring and sustainable management of marine ecosystems relies on a fair knowledge of species biodiversity and their habitats and requires the availability of relevant bioindicators to better understand their functioning. Marine mammals are useful bioindicators of the health of marine ecosystems (Van Bressem et al., 2009), placed at the top of the food chain while most species have long life spans (Wilson et al., 2019). They feed at a high trophic level and have unique fat stores that can lead to accumulation of liposoluble anthropogenic toxins (e.g., Geraci and Lounsbury, 2005; Alvarado-Rybak et al., 2020). Marine mammal populations respond to changes lower down the food chains. Consequently, changes in their distribution, abundance and behavior are indicative and regular monitoring may provide information on changes in the equilibrium of marine ecosystems (Alvarado-Rybak et al., 2020).

We critically review earlier evidence on the cetacean fauna of Mauritania, document relevant new records and update the cetacean checklist by adding two species, and discuss recent insights. This contribution may support future fisheries and bycatch monitoring, studies of cetacean zoogeography and ecology, provide a reference source of information to promote citizen science (e.g., García-Cegarra et al., 2021), marine mammal management and conservation efforts in Mauritania and neighboring nations that share the CCLME ecosystem (see Valdés and Déniz-González, 2015), as well as inform a wider public.

Material and Methods

For this review four different data sources were used: (i) novel data from the Biodiversité-Gaz-Pétrole (BGP) coastal monitoring program (2012–2016); (ii) shipboard surveys of seabirds and marine mammals carried out by the Institut Mauritanien de Recherches Océanographiques et des Pêches (IMROP) and partners during 2012, 2015 and 2016; (iii) cetacean reference collections in Mauritania; and (iv) published and grey literature. Many new specimens, mostly skulls, were collected during periodical beach survey efforts as part of the BGP project implemented by the Mauritanian Ministry of Environment, the Ministry of Fisheries and the Ministry of Oil in collaboration with IMROP and the Office National d'Inspections Sanitaires des Produits de Pêche et de l'Aquaculture (ONISPA). The authors and other team members monitored the 720 km of the Mauritanian coastline from Nouakchott (18°04'44" N, 15°57'56" W) to N'Diago (16°10'01" N, 16°30'00" W) near the border with Senegal, and from Nouakchott harbor north to the Nouadhibou artisanal fishing port (20°56'33" N, 17°02'10" W) in northern Mauritania (Fig. 1). Beaches located 28 km south of Nouakchott ('PK 28') were regularly patrolled (Fig. 1). Beach monitoring was conducted during daytime from 07:00 until 19:00 h using a slow-moving all-terrain vehicle close to the high tide line. This allowed field researchers to cover long distances and readily spot live and dead stranded cetaceans.

The authors also examined specimens, mostly skulls, in the IMROP collection (n≅ 100), Parc National du Banc d'Arguin (PNBA) (n= 48) and the Centre National d'Elevage et des Recherches Vétérinaires (CNERV) at Nouakchott (n≅ 30). Van Waerebeek and Jiddou (2006) priorly revised and catalogued (MR numbers, for Mauritania) skeletal material of 56 cetacean specimens at IMROP. In addition, some 25 skulls were examined by Koen Van Waerebeek (K. V. W.) at the Nouakchott headquarters of the German Agency for International Cooperation (GIZ) in 2015. Although all GIZ specimens were collected from Mauritanian beaches, many lacked numbers and associated voucher data, including location and date of collection. An updated catalogue of cetacean material currently curated at Mauritanian collections will be presented at a later date.

Four shipboard visual surveys of avifauna and megafauna were carried out from R/V *Al Awam* in December 2012, September 2015, August 2016 and April 2018, in which the four IMROP authors participated as observers. Details were presented in (unpublished) cruise reports (Camphuysen et al., 2012; 2015; 2017).

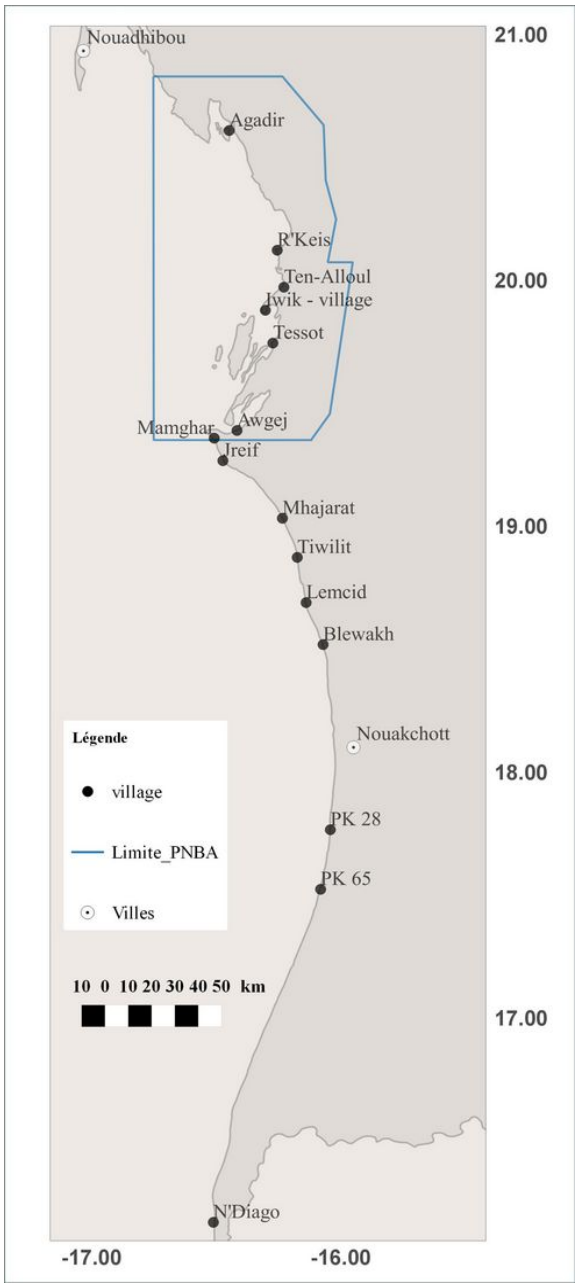

Figure 1: Map of the study area: coast of Mauritania. PNBA limits in blue. We prepared using open access logical QGIS, version 2.18.

The main aim was the mapping of the distribution of seabirds and cetaceans along the Mauritanian continental shelf (neritic zone) and slope. Transects were designed to cross the shelf break preferably at a 90° angle and followed a zigzag pattern with 2–3 shelf–slope crosses each between Nouadhibou and N'Diago (Fig. 1) at an average speed of 8 knots. Data were collected at 5-minute intervals and for each period the geographical position was recorded as well as the ship's speed, sea state, sea surface temperature (SST) and the presence of clearly visible fronts.

While succinctly reviewing cetacean biodiversity in Mauritania, three categories were recognized: (i) Fully confirmed species records with verifiable voucher material, either accessible osteological specimens, diagnostic craniometrics and descriptions, external morphological features (identifiable photographs) or molecular genetic evidence (e.g., Jung et al., 2015; Mullié et al., 2015). Voucher material is considered essential to support first or rare species records or species that are notoriously difficult to distinguish from others. (ii) Probable but unconfirmed species involve unverifiable records for which no voucher material exists or it is inaccessible. (iii) Likely or potential species are those that have not been reported but are expected to occur in Mauritania, considering known distribution in the eastern tropical Atlantic.

Species identifications were verified by cetacean taxonomist K. V. W., aided with relevant keys (i.a., Jefferson et al., 1993; Reyes and Molina, 1997; Culik and Wurtz, 2004; Geraci and Lounsbury, 2005; Würsig et al., 2018; Carwardine, 2020). Documented cases from contiguous range states (Senegal, The Gambia, Morocco, Cabo Verde, Canary Islands (Spain), Guinea) or other areas of CCLME are briefly mentioned where relevant. The English, French (Culik and Wurtz, 2004), Arabic and Farsi (Persian) common names of the cetacean species are provided to promote and facilitate citizen science in the study region (García-Cegarra et al., 2021).

Results

The newly collected records amounted to a total of 14,531 individuals from 2012–2016 pooled from 229 sightings and 848 beach-cast specimens (details archived at IMROP), which allowed us to provide the following species updates. Of the 30 reported species covering six families, 27 are fully authenticated and three species most probably occur (see Table 1).

Delphinidae (Oceanic dolphins)
***Tursiops truncatus* (Montagu, 1821)**

Common bottlenose dolphin; French: Grand dauphin; Arabic: دلفين شائع قاروري الأنف; Farsi: دلفين بينى بطرى معمولى

Specimens. During BGP beach surveys, the authors recorded 104 specimens, both skulls (Fig. 2) and complete carcasses (Fig. 3), but few were collected. Currently 26 *T. truncatus* skulls are curated in the IMROP collection, up from the listed 20 (Van Waerebeek and Jiddou, 2006). Cadenat et al. (1959) first reported *T. truncatus* for Mauritania. Robineau and Vély (1998) encountered 94 specimens along the Mauritanian coast. Specimen MR0020 (Fig. 2) features narrow palatine bones with thinly walled pterygoids, which in the eastern South Pacific is associated with a coastal ecotype (Van Waerebeek et al., 1990).

Sightings. During the R/V *Al Awam* surveys off Mauritania, 15 individuals were sighted in December 2012, 170 in September 2015 and 29 in November 2016 (Camphuysen et al., 2012; 2015; 2017).

Tursiops truncatus is the most frequently observed cetacean species along the north coast of Mauritania. The shallow waters of Banc d'Arguin, in particular, are an important year-round habitat (Maigret, 1980; Vély et al., 1995; Van Waerebeek and Jiddou, 2006). Robineau and Vély (1998) sighted four groups of 26–31 individuals in November 1994 and one group with 30–40 individuals in January 1995 (Vély et al., 1995). Van Waerebeek and Jiddou (2006) documented 11 sightings of 2–36 individuals on the Banc d'Arguin over three days in November 2006 (Fig. 4), concluding that *T. truncatus* is the predominant cetacean species in the PNBA park. Along the Grande Plage, common bottlenose dolphins are most abundant during November–December (Robineau and Vély, 1998).

***Delphinus delphis* Linnaeus, 1758**

Common dolphin; French: Dauphin commun; Arabic: الدلفين الشائع ذوالمنقار القصير; Farsi: دلفین معمولی پوزه کوتاه

Specimens. BGP/IMROP beach surveys documented 68 stranded common dolphins from 2012–2019. Bycatch mortality of common dolphins off Mauritanian shores has long been recognized. Cadenat (1959) first published measurements of seven specimens captured off Nouakchott and Maigret (1981) reported two and seven specimens bycaught, respectively, in May and June 1980. Robineau and Vély (1998) collected 52 common dolphins along the Mauritanian coast. Two mass mortality episodes of indeterminate cause, mainly of this species, were recorded in May 2000 and June 2006 (IMROP, unpublished data).

Figure 2: Ventral (A) and dorsal (B) views of cranially adult calvaria of common bottlenose dolphin *Tursiops truncatus*, Jreiv, 12 February 1994. Curated at IMROP as MR0020 (Photo © K. V. W.)

Figure 3: An adult specimen of the common bottlenose dolphin *Tursiops truncatus* found stranded dead on 10 August 2017. BGP Project (Photo © A. S. B.).

Figure 4: A subgroup of the common bottlenose dolphins *Tursiops truncatus*, including two calves, porpoising near the vessel in shallow waters of the PNBA National Park on 10 November 2006 (Photo © K. V. W.).

Based on molecular genetics, it was recently proposed that the short-beaked *D. delphis* and long-beaked *D. capensis* Gray, 1828 common dolphins may be ecotypes of a cosmopolitan, highly variable, monotypic species *D. delphis* (Cunha et al., 2015). Although we consider that this work is not the final word on *Delphinus* taxonomy, indications are that morphological variability (cranial, coloration) observed in common dolphins in the CCLME (Fig. 5), including Mauritanian waters, indeed suggests variation at an intraspecific level (K.V.W., unpublished data). A cursory check of coloration patterns indicated significant, but clinal, variation (Fig. 6; Djiba et al., 2015).

Macroscopic examination revealed evident dermatopathy in one stranded common dolphin. On its lower right flank (Fig. 7) several tattoo skin disease-like (TSD-like) lesions were present, clinically indicative for cetacean poxviral disease (Bracht et al., 2006; Luciani et al., 2022). Another, free-ranging individual showed two small, dark, TSD-like marks within the dorsal field, one below the dorsal fin and another behind the eye (Fig. 6). These are the first cases of TSD-like lesions in a cetacean encountered in Mauritania and more generally, in waters of the northwest African continent (Van Bressem et al., 2017). However, TSD has been detected in several small cetaceans in the Canary Islands (Kautek et al., 2018; Segura-Göthlin et al., 2021).

Sightings. Observers, including the authors, found common dolphins to be the cetacean species present in largest numbers (total n= 9,612 individuals**)** off the

Mauritanian coast (Fig. 6) during the BGP seabird and marine mammal surveys (Camphuysen et al., 2012; 2015; 2017). Cadenat (1959) first sighted common dolphins offshore of Nouakchott in September 1956 and October 1958. Tulp and Leopold (2004) also reported *D. delphis* as the most abundant species off Mauritania, encountered on most at-sea days, particularly in the south. Djiba et al. (2015) found that 28.7% of all cetacean sightings (32.7% if including 'probable *Delphinus*') in the CCLME were of this species and these represented 71.3% (76.5%) of all individuals of Cetacea seen. Russell et al. (2018) reported seven sightings (∑= 760 individuals) of a long-beaked form of common dolphin.

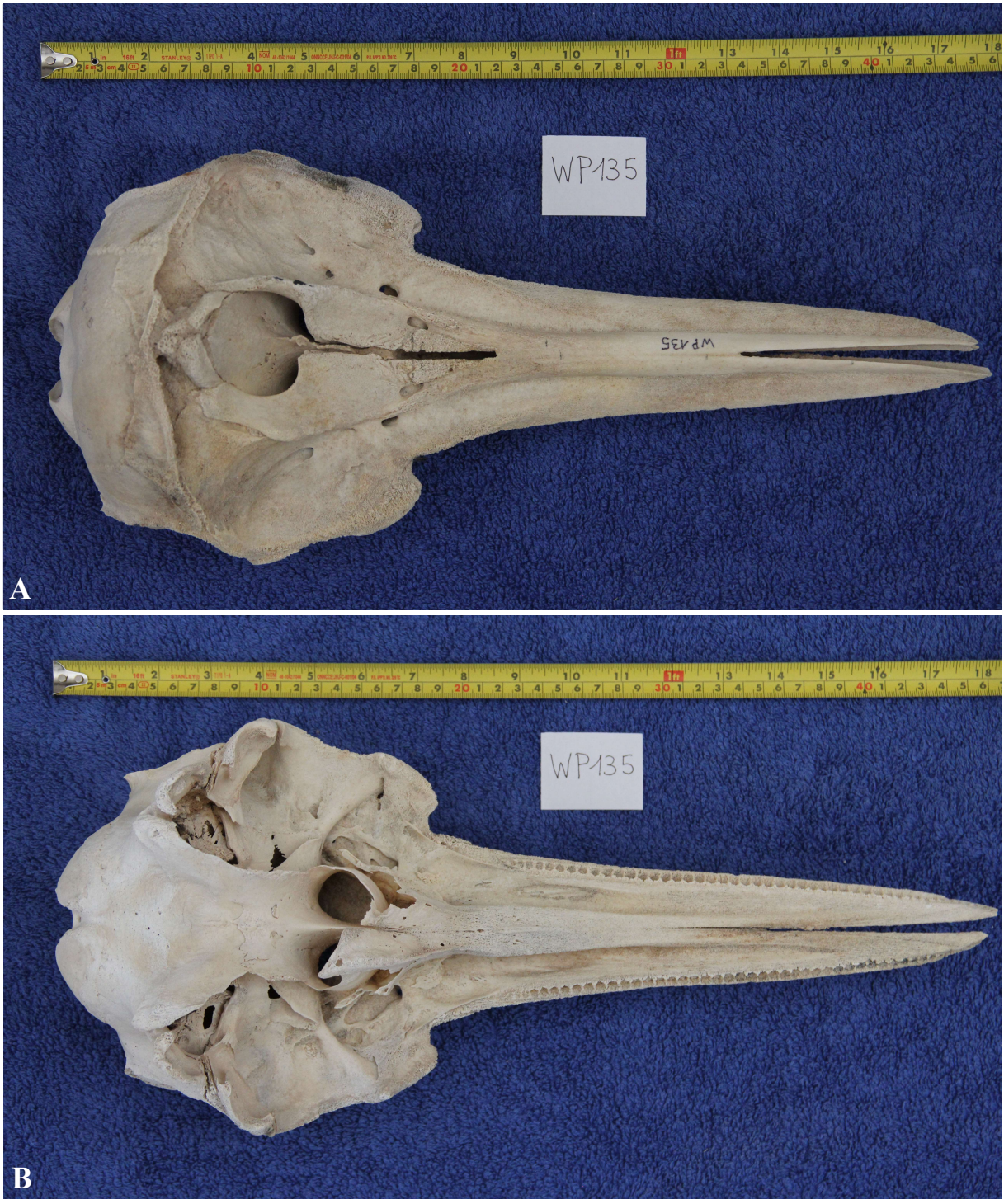

Figure 5: Dorsal (A) and ventral views (B) of cranially adult calvaria (WP135; IMROP) of the common dolphin *Delphinus delphis* from the Mauritanian coast. Note the pseudo-lanceolate shape of the proximal palatinal ridge (*sensu* Van Waerebeek, 1997), typical in common dolphins of northwest Africa (Photos © K. V. W.).

Figure 6: Common dolphin *Delphinus delphis* observed on 08 August 2012 (Photo © Hans Verdaat).

Figure 7: A dead juvenile specimen of the short-beaked common dolphin *Delphinus delphis* found stranded on 07 February 2018 during BPG project. Note multiple lesions on right flank, pathognomonic for tattoo skin disease (TSD), a first case in Mauritanian cetaceans and on the northwest African continent (Photo © A. S. B.).

***Stenella coeruleoalba* (Meyen, 1833)**

Striped dolphin; French: Dauphin bleu et blanc, Dauphin rayé; Arabic: الدلفين المُخطّط; Farsi:دلفین نواری

Specimens. Robineau and Vély (1998) collected a first calvaria on the Grande Plage identified as *Stenella coeruleoalba*. However, this record lacks supporting evidence and no specimen could be located in a Mauritanian collection. A freshly dead striped dolphin stranded on a beach north of Nouakchott in January 1997 and was butchered for food (Fig. 8). Another four specimens were found south of Nouakchott during BGP beach surveys: one in August 2014, another in November 2015 (Fig. 9) and

two on 28 April 2016 (220 cm male at 19°52'41" N, 16°18'19" W; 210 cm female at 16°47'55" N, 16°22'10" W). In Senegal, a specimen was reportedly harpooned off M'Bour (Cadenat, 1949). Two historical specimen records (in 1882 and 1942) were possibly valid (see discussion in Van Waerebeek et al., 2000).

Sightings. No striped dolphins have been sighted in Mauritanian coastal waters (see Tulp and Leopold, 2004; Camphuysen et al., 2012, 2015, 2017; Djiba et al., 2015), presumably because of the species' far offshore, pelagic habitat (Best, 2007) and its general scarcity off continental Northwest Africa (e.g., Van Waerebeek et al., 2000). A single documented record for Atlantic Morocco consists of a small group (n= 12) photographed by K. V. W. off Marrakesh in July 2012 (Plate 5.7.2 in Djiba et al., 2015). The species is frequently encountered in deep waters off the Canary Islands (Ritter and Wähner, 2011).

***Stenella frontalis* (Cuvier, 1829)**

Atlantic spotted dolphin; French: Dauphin tacheté Atlantique; Arabic: الدلفين الأطلسى الأرقط; Farsi: دلفين خالدار اطلس

Specimens. A mass mortality from fishing interaction killed at least 125 dolphins between Nouamghar and Nouakchott during November–December 1995. Of these, 37 were positively identified as *Stenella frontalis* (Nieri et al., 1999). It is unclear whether some of these specimens were collected, but no material is curated in the IMROP collection. A new *S. frontalis* specimen washed ashore at 17°05'40" N, 16°14'40" W; on 16 November 2012 it was examined in situ (Fig. 9) but was not collected.

Sightings. Six groups (2–50 individuals, median= 19) and nine groups (2–360 individuals, median= 48) of a generally unspotted offshore form of Atlantic spotted dolphin were sighted from R/V *Al Awam* during November–December 2012 and in September 2015, respectively, several of which are supported by photographs (Fig. 10) (p. 49 in Camphuysen et al., 2012; Camphuysen et al., 2015).

***Stenella clymene* (Gray, 1850)**

Clymene dolphin; French: Dauphin de Clyméné; Arabic: الدلفين كلايمين; Farsi: دلفين كلايمن

Specimens. One positively described *Stenella clymene* calvaria was collected 113 km north of Nouakchott on 27 November 1992 (Robineau et al., 1994; Robineau and Vély, 1998) but its whereabouts are unknown. No other specimen records have been published and no *Stenella clymene* material is present in the IMROP collection. One documented specimen record exists for the Saloum Delta, Senegal (Cadenat and Doutré, 1958) and a confirmed calvaria (PFM-001) was collected at Bijol Islands, The Gambia (Murphy et al., 1997; Figure 8 in Van Waerebeek et al., 2000; Perrin and Van Waerebeek, 2012).

Sightings. Clymene dolphin occurs in deep tropical and subtropical waters of the Atlantic Ocean (Perrin et al., 1981), while it is particularly common in the northern Gulf of Guinea (Van Waerebeek et al., 2009; de Boer et al., 2016). A general review indicates the occurrence of Clymene dolphins between the central Mauritanian coast and southern Angola (Weir et al., 2014). Group size ranged from 3–1,000 animals, with 60.9% of groups comprising about 50 animals. One large pod of ca. 560 *S. clymene* was photographed off southern Mauritania at 16°30'00" N, 16°59'48" W (depth 1,102 m) on 08 September 2015 (Camphuysen et al., 2015) (Fig. 11). Russell et al. (2018) reported 150 individuals in 2012.

***Stenella longirostris* (Gray, 1828)**

Spinner dolphin; French: Dauphin longirostre; Arabic: الدلفين الدوار; Farsi: دلفين چرخنده

Specimens. Spinner dolphins are distributed in all tropical and most subtropical waters worldwide (Carwardine, 2020), but historical specimen records for Mauritania are lacking (Robineau and Vély, 1998; Perrin and Van Waerebeek, 2012). Here we report on new specimens. One skull was collected in southern Mauritania on 11 June 2014 during a BGP beach survey. For two calvariae (W420 and St1) examined by K. V. W. at GIZ headquarters, no associated data were available, and one of these is likely identical with the former one. Specimen W420 (with condylobasal length (CBL)= 431 mm) showed >50 maxillar alveoli per half-jaw (Fig. 12), while specimen St1 (CBL ≅ 417 mm, with eroded rostrum tip) had about 50 maxillar alveoli each side. Standard craniometrics are archived with the authors.

Van Bree (1971a) documented four skulls of *Stenella longirostris* from Senegal and deposited these at the Musée de l'Institut Fondamental d'Afrique Noire (IFAN) Dakar Museum, as well as one from Côte d'Ivoire. No specimens exist for Morocco nor The Gambia (Bayed and Beaubrun, 1987, 1996; Van Waerebeek et al., 2000). The above-mentioned skulls are the first specimen records of *S. longirostris* for Mauritania and apparently the northernmost corroborated records off continental northwest Africa (Perrin and Van Waerebeek, 2012). Very rare specimens are mentioned (not documented) for the Canary Islands (Ritter and Wähner, 2011).

Sightings. Russell et al. (2018) observed one pod of 392 individuals of *S. longirostris* during a geophysical survey in 2012. Duguy (1976) reportedly sighted a group of 50 individuals north of Cap Vert, Senegal. None of these sightings seem to be supported. The species was not encountered during R/V *Dr. Fridtjof Nansen* coastal surveys off northwest Africa (Djiba et al., 2015), but mostly neritic habitat was studied. We conclude that spinner dolphins are uncommon in the CCLME ecosystem and probably restricted to far offshore waters.

Figure 8: Fresh carcasses of the striped dolphin *Stenella coeruleoalba* (A) stranded on a Nouakchott beach, January 1997 (Photo IMROP Archives); (B) A male found at PK 28 beach south of Nouakchott on 17 November 2015 (Photos © A. S. B., IMROP). Main and accessory lateral stripes are clearly present in both specimens.

Figure 9: Atlantic spotted dolphin *Stenella frontalis* found stranded at 17°05'40" N, 016°14'40" W on 16 November 2012. (Photo © A. S. B., IMROP).

Figure 10: Atlantic spotted dolphins *Stenella frontalis* observed from R/V *Al Awam* on 8 September 2015 **(**Photo © Hans Verdaat). Note individuals are largely unspotted, typical for the offshore form.

Figure 11: Several individuals of the Clymene dolphin *Stenella clymene* observed in Mauritanian waters from R/V *Al Awam*, on 08 September 2015 **(**Photos © Hans Verdaat).

Figure 12: Dorsal (A) and ventral view (B) of the calvaria W420 of a cranially adult spinner dolphin *Stenella longirostris* examined in the GIZ-Nouakchott collection on 25 April 2015 (Photo © K. V. W.). Craniometrics available. Note the long rostrum, small alveoli (>50 each half upper jaw) and wide proximal palatinal ridge.

***Stenella attenuata* (Gray, 1846)**

Pantropical spotted dolphin; French: Dauphin tacheté pantropical; Arabic: الدلفين المدارى الأرقط; Farsi: دلفين خالدار مناطق گرمسير

Specimens. The authors did not identify any *Stenella attenuata* during the BGP beach surveys; however, many carcasses in advanced decomposition were not collected and could not be assigned beyond *Stenella/Delphinus*. Pantropical spotted dolphin has a tropical to subtropical distribution worldwide (Carwardine, 2020); however, to date no specimen records exist for Mauritania (Robineau and Vély, 1998; Perrin and Van Waerebeek, 2012; Djiba et al., 2015; this paper).

Sightings. A group of 14 dolphins identified as *Stenella attenuata* was observed from R/V *Al Awam* at 19°27'36" N, 17°15' W on 12 September 2015 but no photos were taken (Camphuysen et al., 2015). Russell et al. (2018) reported 59 individuals from a geophysical survey in 2012. *Stenella attenuata* has a preference for tropical oceanic waters and may largely avoid the cooler, upwelling-modified neritic habitat of the CCLME, including off Mauritania (Djiba et al., 2015).

***Lagenodelphis hosei Fraser*, 1956**

Fraser's dolphin; French: Dauphin de Fraser; Arabic: الدلفين فريزر; Farsi: دلفين فريزر

Specimens. No historical cases of Fraser's dolphin are reported for Mauritania (Maigret et al., 1976; Robineau and Vély, 1998; Perrin and Van Waerebeek, 2012). A BGP beach survey yielded one *L. hosei* calvaria (Fig. 13) in southern Mauritania (bordering Senegal) at 16°37'24" N, 16°26'19" W in February 2014 (Fig. 13), representing a new country record.

A probable second specimen stranded at 16°34'15" N, 16°26'49" W. Identification was based mainly on a low tooth count of 37–38 alveoli in the upper half-jaws, alveoli with small diameter, a short rostrum with a wide base (as determined with standard craniometrics: rostrum length / rostrum width at base= 2.02–2.09 vs. 2.38–2.43 in *Stenella clymene* and *S. coeruleoalba*, respectively), a large preorbital process and a wide, grooved palate (Perrin et al., 1994). In northwest Africa, Fraser's dolphin is rarely registered with only a few authenticated specimens. One stranding each is reported from the Canary Islands (Vonk and Martin, 1990) and Sangomar Island, Senegal (Van Waerebeek et al., 2000) and two from Cabo Verde (Torda et al., 2010). Fraser's dolphin is regularly landed as bycatch in western Ghana for marine bushmeat (e.g., Van Waerebeek et al., 2009; Debrah et al., 2010).

Figure 13: Dorsal (A) and ventral views (B) of calvaria of Fraser's dolphin *Lagenodelphis hosei* found at 16°37'24" N, 16°26'19" W on 15 February 2014. (Photo © A. S. B., IMROP). Distal splitting of the left and right (pre)maxillaries due to desiccation (sun erosion) makes rostrum appear less tapered than in an undamaged skull. Estimated upper tooth counts: 37–38 per half-jaw. Estimated CBL= 445 mm (cranially adult specimen).

Sightings. Fraser's dolphin is distributed worldwide in tropical and subtropical oceanic waters within 30° of the equator (Carwardine, 2020), but the literature does not report sightings for Mauritania, nor Senegal (Camphuysen et al., 2012, 2015; Djiba et al., 2015; Russell et al., 2018). Here we report a first observation of a large group at 16°02'12" N, 17°10'14" W on 05 November 2021, as sighted by Abdellahi Samba Bilal (A. S. B.) (Fig. 14).

Photo-supported sightings are documented also for the Canary Islands (Ritter and Wähner, 2011). The species is not uncommon in the Gulf of Guinea (Weir et al., 2008). Off Ghana and Côte d'Ivoire, *L. hosei* was found to be the most abundant species due to large group sizes, often many hundreds (de Boer et al., 2016).

***Steno bredanensis* (Lesson, 1828)**

Rough-toothed dolphin; French: Sténo; Arabic: الدلفين ذوالأسنان الخشنة; Farsi: دلفين دندان درشت

Specimens. A first stranding was mentioned from Cap Timiris (Duguy, 1976). Maigret (1980) reported two strandings in Baie du Lévrier (May 1975 and 25 January 1978) and one at Cap Timiris on 20 January 1975. However, these remain unverifiable because of the lack of a specimen or voucher data. A cranially immature calvaria (MR-0061; CBL= 535 mm) was collected in southern Mauritania during a BGP survey in February 2014 and is deposited at IMROP (Fig. 15). In addition, a fairly fresh carcass was photographed on a beach near Nouadhibou (Fig. 16) on 02 April 2021 but was not collected.

Sightings. On 21 June 1988, 10–12 rough-toothed dolphins approached a Dutch research vessel at 20°40' N, 17°31' W in rather shallow water (70 m depth) 51 km west off Cap Blanc and are authenticated with photographs (Addink and Smeenk, 2001). Unsupported sightings include one in Baie du Lévrier on 20 February 1952 (Duguy, 1976) and another two in the same bay on 20 January 1952 and 23 July 1975 (Maigret, 1981). The frequent presence of *T. truncatus* in the area (Van Waerebeek and Jiddou, 2006) with a similar morphology underscores the need for voucher material as much as possible. The most recent sighting was of 50 animals in 2012 (Russell et al., 2018).

***Sousa teuszii* (Kükenthal, 1892)**

Atlantic humpback dolphin; French: Dauphin du Caméroun, Dauphin à bosse Atlantique; Arabic: الدلفين ذو السنام الأطلسي; Farsi: دلفین گوژپشت اطلس

Specimens. Most Atlantic humpback dolphins found stranded (n= 15) originated from the Parc National du Banc d'Arguin (PNBA) (Robineau and Vély, 1998), indicating it as the species' main habitat in Mauritania (Van Waerebeek et al., 2000, 2004). Hence, this discrete population of *Sousa teuszii* was named the "Banc d'Arguin" stock, deemed to be reproductively separated from the Saloum Delta (Senegal) stock and Dakhla (Western Sahara) stock (Van Waerebeek et al., 2003). A single skull from the PNBA (MR-0050) is deposited at IMROP (Fig. 17A), five skulls are curated at PNBA, six are at CNERV, while earlier ones may have been exported. The most recent known specimen, following beach monitoring by IMROP, is an adult male (SL= 235 cm) encountered at 19°17'36" N, 16°28'53" W on 10 May 2013 (Fig. 17B).

Sightings. Live animals have mostly been reported from the Banc d'Arguin and the shallow waters near Iwick, most of these at least two decades ago. Five sightings were reported south of Nouamghar. None have been documented from Baie du Lévrier or Cap Blanc (Maigret, 1980; Van Waerebeek et al., 2004). Surprisingly, a 3-day boat survey of the Banc d'Arguin in November 2006 yielded 11 sightings of *T. truncatus* but not a single one of *Sousa teuszii* (Van Waerebeek and Jiddou, 2006). The only published photo of free-ranging *Sousa teuszii* in Mauritania is of a small group porpoising at Banc d'Arguin in the 1980s (Maigret, 1986). A renewed boat survey effort is urgently needed.

***Grampus griseus* (Cuvier, 1812)**

Risso's dolphin; French: Grampus, Dauphin de Risso; Arabic: الدلفين رسّو; Farsi: دلفین ریسو

Specimens. Duguy (1976) first reported the collection of a *Grampus griseus* skull at Nouamghar in 1973. Robineau and Vély (1998) mentioned five *Grampus griseus* strandings, one near Cap Blanc and four around Nouakchott, likely accounting for two specimens kept at IMROP (MR0032 and MR0038) and examined in November 2005 (Van Waerebeek and Jiddou, 2006). Currently, cranial material of seven Risso's dolphins are curated in the IMROP collection. Twelve specimens were encountered during the BGP beach surveys, including a 288 cm moderately decomposed carcass re-encountered in October 2017. The most recent is a fresh specimen found on a Nouakchott beach, at 18°15'54" N, 16°02'18" W on 17 August 2021 (Fig. 18). These data suggest *Grampus griseus*, a warm temperate water adapted species (Perrin and Van Waerebeek, 2012), to be common off Mauritania.

Sightings. Two groups of Risso's dolphin were observed in Mauritanian waters, both from R/V *Al Awam* (Fig. 13). A group of nine Risso's dolphins was sighted at 18°07'30" N, 16°42'22" W on 06 December 2012 and another 11 individuals were recorded at 20°00'00" N, 17°34'55" W on 08 December 2012 (Camphuysen et al., 2012). In September 2015, 14 groups were observed (range= 1–24 individuals) also from R/V *Al Awam* (Camphuysen et al., 2015). Djiba et al. (2015) photographed two groups off Morocco in July 2012. Risso's dolphin has not been documented from Senegal (Van Waerebeek et al., 2010; Djiba et al., 2015), which may reflect a low survey effort in deeper offshore areas.

Figure 14: First confirmed sighting of Fraser's dolphins *Lagenodelphis hosei* in Mauritanian waters in 2021 (see text for details). Note the small, pointed, subtriangular dorsal fin and a short beak. Large group size is also characteristic (Photo © A. S. B.).

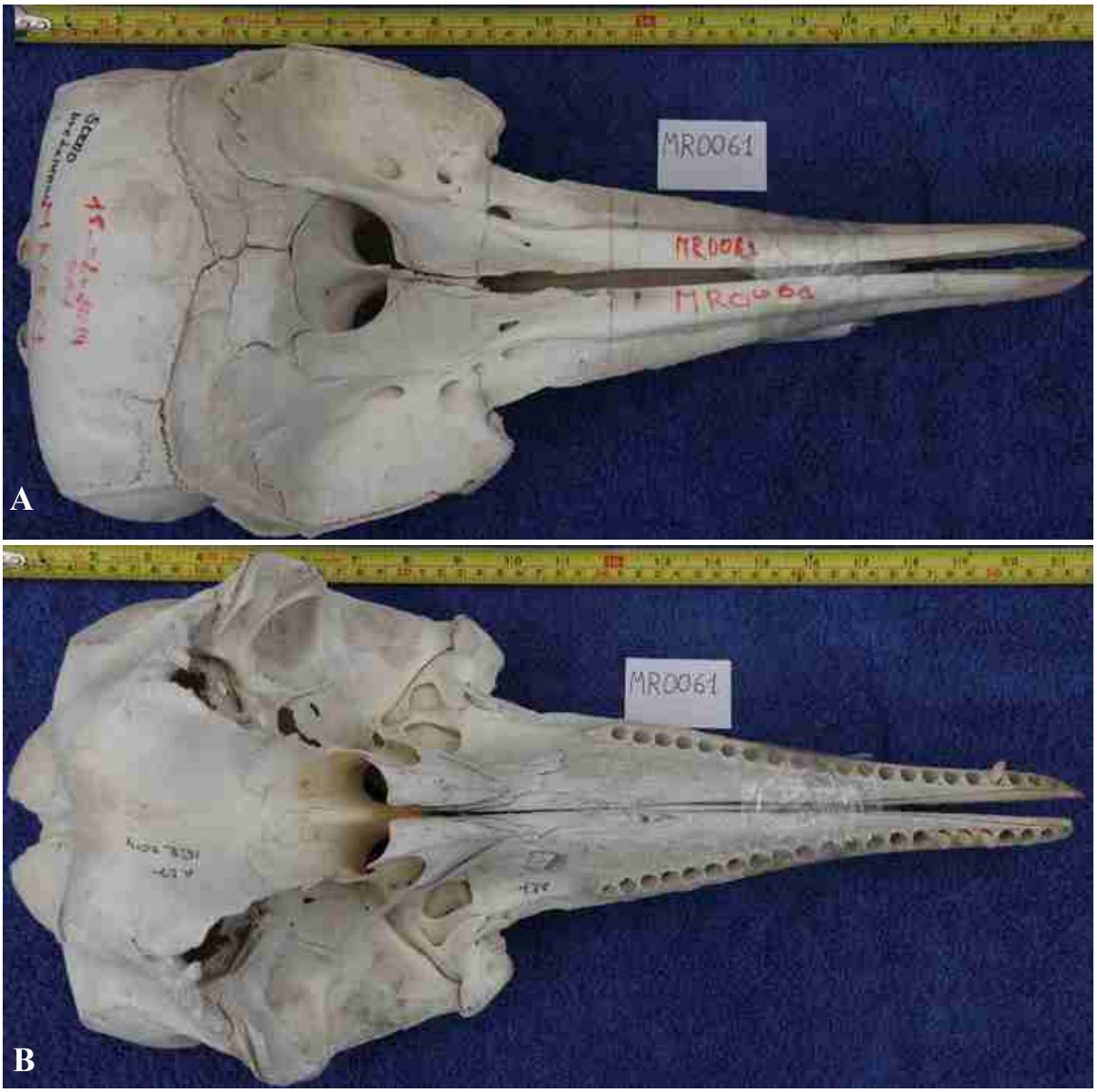

Figure 15: Dorsal (A) and ventral (B) views of calvaria (MR0061; IMROP) of the Rough-toothed dolphin *Steno bredanensis*. Cranially immature (CBL= 535 mm). Collected in southern Mauritania, February 2014. (Photos © K. V. W.).

Figure 16: Fresh carcass of a rough-toothed dolphin *Steno bredanensis* stranded near Nouadhibou on 02 May 2021.

Figure 17: (A) Dorsal and ventral views of skull (MR-0050) of the Atlantic humpback dolphin *Sousa teuszii* collected from PNBA in August 2008 and curated at IMROP (Photo © K. V. W.). (B) A male specimen of the Atlantic humpback dolphin washed ashore at 19°17'36" N, 16°28'53" W on 10 May 2013 (Photo © A. S. B.), the most recent documented *S. teuszii* specimen record for Mauritania.

Figure 18: A freshly dead Risso's dolphin *Grampus griseus* found stranded on a Nouakchott beach at 18°15'53" N, 16°14'49" W on 17 August 2021 (Photo © A. S. B.).

***Peponocephala electra* (Gray, 1846)**

Melon-headed whale; French: Péponocéphale; Arabic: حوت بطيخي الرأس; Farsi: نهنگ سر خربزه‌ای

Specimens. Robineau and Vély (1998) mentioned finding a skull at Cap Alzas (20°25'00" N, 16°20'18" W) in January 1995, but this report lacks documentation and the specimen has not been located. No supported cases are known for Mauritania. One well-documented skull originated from the Saloum Delta, Senegal, another from the Bijagos Archipelago, Guinea-Bissau (van Bree and Cadenat, 1968). Two mass strandings are known from the Cabo Verde islands (Van Waerebeek et al., 2008).

Sightings. The species occurs in tropical and subtropical waters worldwide, with preference for deep offshore habitat (Carwardine, 2020). None have been sighted off Mauritania, presumably due to the cool upwelling habitat of CCLME.

***Orcinus orca* (Linnaeus, 1758)**

Killer whale; French: Orque; Arabic: الحوت القاتل; Farsi: نهنگ قاتل

Specimens. Cranial material of two killer whales is curated at IMROP. One is a complete adult skull (4 × 12 alveoli; MR0034) collected at Mejratt on 11 November 1993 (Fig. 20) and the other is a left mandible (MR0056) with 12 diagnostic oval-shaped (in cross-section) tooth alveoli from an unspecified locality in Mauritania. A male killer whale was found stranded in Baie de Cansado, near Nouadhibou on 10 November 2010 (Fig. 19). A fourth specimen, a cranially mature skull without data or number was identified by K. V. W. at the GIZ Nouakchott headquarters on 25 April 2015.

Sightings. Killer whales are unmistakable at sea, hence bona fide sightings by laypeople can be credible. Small groups of 1–3 individual killer whales are observed year-round in Mauritanian waters. Most sightings have been from Baie du Lévrier and a few from the Banc d'Arguin area (Hammond and Lockyer, 1988; Maigret, 1990; Robineau and Vély, 1998). Orcas are seen also with some regularity off Senegal (Van Waerebeek et al., 2000; Djiba et al., 2015). A pod of six individuals was encountered in southern Mauritania at 17°07' N, 16°36' W in 98 m deep water on 07 September 2015 (Camphuysen et al., 2015). Djiba et al. (2015) estimated an encounter rate in CCLME coastal waters of 0.088 individuals 100 km^{-1}.

***Globicephala macrorhynchus* Gray, 1846**

Short-finned pilot whale; French: Globicéphale tropical; Arabic: الحوت الطيار قصير الزعانف; Farsi: نهنگ پایلوت باله کوتاه

Specimens. Two verified *Globicephala macrorhynchus* skulls (for identification criteria see van Bree, 1971b) are curated at IMROP (Van Waerebeek and Jiddou, 2006). Skull MR0031 was collected at PNBA on 02 October 1993, while calvaria MR0033 was found at PK66 south of Nouakchott on 14 July 1993 (Fig. 21). Three cranial specimens, one from around Nouakchott, were also reported (Robineau and Vély, 1998) but their whereabouts are unknown. During recent BGP surveys we found 13 pilot whale specimens (Fig. 22) including five complete individuals with two measuring 440–449 cm.

Figure 19: Male killer whale *Orcinus orca* encountered at Baie de Cansado, Nouadhibou on 10 October 2010 (Photo © Saiko Omar Kidé, IMROP). Cause of death is unknown.

Figure 20: Dorsal view of an adult skull of the Killer whale *Orcinus orca* collected at Mejratt on 11 November 1993. Curated at IMROP as specimen MR0034. (Photo © K. V. W.).

Figure 21: Dorsal view of an adult calvaria of the Short-finned pilot whale *Globicephala macrorhynchus* curated at IMROP as MR0033 (Photo © K. V. W.). Anteriad the premaxillaries completely cover the maxillaries, a main distinguishing feature compared to *Globicephala melas* in which the maxillaries remain visible.

Figure 22: Decomposed carcass of a Short-finned pilot whale *Globicephala macrorhynchus* stranded at 18°24' 3" N, 16°3'2" W. Registered on 08 April 2015 (Photo © A. S. B.).

Sightings. Short-finned pilot whales are encountered mostly in the offshore CCLME, particularly in continental slope waters (Fig. 23). However, during November–December 2012, Camphuysen et al. (2012) did not encounter any pilot whales off Mauritania, despite surveying deep waters. Camphuysen et al. (2015) estimated a total of 527 individuals in 38 sightings. Group size averaged 65.9 ± 57.8 individuals (range= 14–178, n= 8). Most sightings were within the oceanic zone (mean water depth= 879 ± 97 m, range= 760–1,114 m) and a majority of the sightings were in the southern half of the study area with high sea surface temperatures (SST 28.8 ± 1.5 °C, range= 26.1–30.0 °C) (Camphuysen et al., 2015). The pilot whales were often associated with *T. truncatus*, as in other areas of western Africa. The encounter rate of *G. macrorhynchus* in CCLME neritic habitat, and some continental slope waters, was a low 0.47 individuals 100 km^{-1} (Djiba et al., 2015) with sightings located off Guinea-Bissau and Guinea.

***Globicephala melas* (Trail, 1809)**

Long-finned pilot whale. French: Globicéphale commun; Arabic: الحوت المُرشد طويل الزعانف; Farsi: نهنگ پایلوت باله بلند

Specimens. No *Globicephala melas* material is present at IMROP, PNBA, CNERV or GIZ. Nonetheless, Robineau and Vély (1998) reported on five skulls or calvariae which they identified as long-finned pilot whale, of which two found north and one south of Nouakchott (others of unknown locality). However, no identification criteria or craniometrics were discussed, none were pictured, and the skulls' whereabouts are unknown. Van Waerebeek et al. (2008) warned that immature and some subadult skulls of *G. macrorhynchus* are readily misidentified as *G. melas* because only with cranial maturity do the premaxillaries laterally expand to such a degree to almost completely cover (with less than 10 mm exposure) the distal half of the maxillaries (van Bree, 1971b). The at least occasional presence of *G. melas* off Mauritania is considered highly likely but, to date, not authenticated.

Sightings. A pod of some 30 pilot whales, mixed with 12 *T. truncatus,* was sighted just north of Cap Blanc at 21°24' N, 17°42' W on 13 July 1973, and was labeled *Globicephala melaena* (Duguy, 1976). Nores and Pérez (1988) claimed that "the boreal species [i.e., *G. melas*] dominates African coastal waters, from Morocco to Mauritania" and for the latter country they cite Maigret et al. (1976) and Duguy (1976), who reported two at-sea observations. However, Robineau and Vély (1998) correctly object that these sightings could have been either species. Without distinguishing features reported (Duguy, 1976), we must consider these as *Globicephala* sp.

***Pseudorca crassidens* (Owen, 1846)**

False killer whale; French: Faux-orque; Arabic: الحوت القاتل المزيف; Farsi: نهنگ قاتل کاذب (نهنگ شبه)

Specimens. Although *Pseudorca crassidens* is distributed worldwide in tropical to warm temperate waters, no specimens are recorded for Mauritania (Robineau and Vély, 1998; Perrin and Van Waerebeek, 2012) despite the considerable recent beach survey efforts. We suggest that *Pseudorca crassidens* is uncommon off Mauritania, at least in coastal waters.

Sightings. Two small groups of two and nine individuals were photographed (Fig. 24) from R/V *Al Awam* over the continental slope at depths of, respectively, 383 m and 492 m, on 12 September 2015 (Camphuysen et al., 2015).

Phocoenidae (Porpoises)
***Phocoena phocoena* (Linnaeus, 1758)**

Harbor porpoise; French: Marsouin commun; Arabic: خنزير البحر المألوف; Farsi: پورپویز بندرگاه

Specimens. The harbor porpoise was first documented in Mauritania more than half a century ago (Fraser, 1958). Its common presence along most of the Mauritanian coast, but especially in the north, is confirmed by regular strandings (Robineau and Vély, 1998; this paper). Between April 1999 and May 2000, one of the present authors (A. S. B.) recorded 14 stranded individuals between Nouakchott and Nouamghar with body sizes ranging 120–173 cm. More recently, four

years (2012–2016) of systematic BGP coastal surveys revealed the remains of 321 porpoises, many of these showing clear marks of fisheries interactions (Mullié et al., 2013). Merely in the month of June 2014, 80 dead porpoises were found with body sizes ranging from 107–210 cm (Fig. 25).

Sightings. Only a few georeferenced sightings of harbor porpoise have been registered for Mauritania (Robineau and Vély, 1998). Van Waerebeek and Jiddou (2006) sighted five small groups (median= 3 individuals, range= 2–14 individuals) near Cap Blanc on 11 November 2006. Camphuysen et al. (2012) sighted three single individuals in the same area, one on 02 December 2012 and two on 03 December 2012. The harbor porpoise is the smallest cetacean of Mauritania and with its rounded, beakless head, small triangular dorsal fin and brief surfacings, it is rather unmistakable, especially for a trained observer.

Figure 23: Short-finned pilot whales *Globicephala macrorhynchus*: (A) Individual observed on 06 September 2012 (Photo © Hans Verdaat), (B) a group observed on 09 November 2021, note the small calf (Photo © A. S. B.).

Figure 24: False killer whales *Pseudorca crassidens* observed on 12 September 2012 (Photo © Hans Verdaat). Dorsal fin somewhat more pointed than usual.

Figure 25: Harbor porpoise *Phocoena phocoena* incidentally net-entangled and probably discarded by artisanal fishers (Photo © A. S. B.).

Physeteridae (Sperm whales)
***Physeter macrocephalus* Linnaeus, 1758**

Sperm whale; French: Cachalot; Arabic: حوت العنبر; Farsi: نهنگ اسپرم

Specimens. For a cosmopolitan species like *Physeter macrocephalus*, surprisingly limited material evidence exists in Mauritania. The almost complete skeleton of a sperm whale stranded locally in December 1990 and collected by M. Vély (Robineau and Vély, 1998; in litt. 29 July 2022) is maintained outside near the PNBA station at Iwick at 19°51' N, 16°20' W (Robineau and Vély, 1998) (Fig. 26). Another stranding, from 20 km north of Nouakchott in December 1980 lacks voucher material (Maigret, 1981).

Sightings. Camphuysen et al. (2012) reported nine sightings of sperm whales made on a single day (08 December 2012). All were singletons, except for a group of seven individuals. More sperm whales were reported in September 2015 (Camphuysen et al., 2015) (Fig. 27).

Kogiidae (Kogiid sperm whales)
***Kogia sima* Owen, 1866**

Dwarf sperm whale; French: Cachalot nain; Arabic: حوت العنبر القزمی; Farsi: نهنگ اسپرم کوتوله

Specimens. No historical records for this species exist for Mauritania (Robineau and Vély, 1998; Perrin and Van Waerebeek, 2012). The dwarf sperm whale, the smaller of the two kogiid species, was documented for the first time from a stranding in southern Mauritania (17°34'49" N, 16°04'06" W) in August 2014. The skull is curated at IMROP (Fig. 28). Although two specimens were reported for Senegal (Maigret and Robineau, 1981), none were present in the IFAN zoological collection in Dakar when examined during 1999–2000 (Van Waerebeek et al., 2000).

Sightings. Russell et al. (2018) reported two individuals seen during a geophysical survey in 2012, but no photos were available. Moreover, distinction from the congeneric *Kogia breviceps* (de Blainville, 1838) (see below) is extremely difficult at sea and we cannot consider these substantiated sightings.

***Kogia breviceps* (de Blainville, 1838)**

Pygmy sperm whale; French: Cachalot pygmé; Arabic: حوت العنبر القزم; Farsi: نهنگ اسپرم کوچک

Specimens. Two strandings of pygmy sperm whales have been reported for Mauritania, a 315 cm carcass (size >270 cm indicative for *K. breviceps*) at Grande Plage in August 1992 and a calvaria collected at the Parc National du Banc d'Arguin in January 1995 (Robineau and Vély, 1998). Here, we report a third specimen. The senior author (A. S. B.) encountered a carcass (Fig. 29A) at 19°05'55" N, 16°16'26" W on 15 November 2013. Its calvaria (Fig. 29B) was examined by K. V. W. at the GIZ headquarters in Nouakchott on 25 April 2015. Some key cranial measurements include condylobasal length (CBL), 427 mm; rostrum width at base (RW), 225 mm; preorbital skull width (POW), 368 mm; and zygomatic skull width (ZYGW), 346 mm.

Sightings. No live pygmy sperm whales are documented for Mauritania, but *Kogia* spp. are notoriously hard to spot and identify at sea as they show very little body when surfacing. Among cetaceans, kogiid whales may well be underreported. The pygmy sperm whale was mentioned as present also in the waters of the Canary Islands (Casinos, 1977; Vonk and Martin, 1988) and Madeira (Maul and Sergeant, 1977).

Ziphiidae (Beaked whales)
***Mesoplodon europaeus* Gervais, 1855**

Gervais' beaked whale; French: Baleine à bec de Gervais; Arabic: حوت لِجيرفيه ذوالمنقار; Farsi: نهنگ جروایس

Specimens. The carcass of a 455 cm female Gervais' beaked whale was found stranded south of Nouakchott (17°14' N, 16°11' W) on 02 December 1992. It was positively identified from diagnostic cranial features documented in some detail (Robineau and Vély, 1993, 1998).

Figure 26: Skeleton of a sun-weathered adult sperm whale *Physeter macrocephalus* deposited outside the PNBA office at Iwick, as documented in December 2000 (Photo © K. V. W.). Details of stranding unclear.

Figure 27: Head and blowhole of sperm whale *Physeter macrocephalus* observed on 14 September 2015 (Photo ©Hans Verdaat).

Figure 28: Ventral [Left] and dorsal views [Right] of a cranially adult calvaria of the Dwarf sperm whale *Kogia sima* collected at 17°34'49" N, 16°04'6" W, southern Mauritania on 26 August 2014. First species record for Mauritania. Complete skull is curated at IMROP. (Photos © A. S. B., IMROP).

Figure 29: Decomposed carcass of the Pygmy sperm whale *Kogia breviceps* found on 15 November 2013 (A), and skull of the same animal recovered two months later (B), now curated at IMROP (Photos © A. S. B., IMROP).

The CBL of the skull was 753 mm. Unfortunately, its current location is unknown. We found a second specimen, a skull, at 17°05'11" N, 16°14'53" W on 24 December 2021, now deposited in the IMROP collection (WP298). Diagnostic cranial features (small, subapical mandibular teeth with forward inclination; shape of synvertex) are shown in Fig. 30. *Mesoplodon europaeus* has also been recorded from the Canary Islands, Azores and Guinea-Bissau (Robineau and Vély, 1998; Ritter and Wähner, 2011; Perrin and Van Waerebeek, 2012).

Sightings. None have been confirmed from Mauritanian waters, but Camphuysen et al. (2015) listed a possible sighting of two animals off the southern coast on 09 September 2015.

***Mesoplodon densirostris* (de Blainville, 1817)**

Blainville's beaked whale; French: Baleine à bec de Blainville; Arabic: حوت بلانفيل ذوالمنقار; Farsi: نهنگ پوزه‌دار بلین ویل

Specimens. The skull of an animal that stranded on a beach of Nouakchott in October 1992 (Robineau and Vély, 1998) is still the only case reported for Mauritania, but it was not located in any public Mauritanian collection. This widely distributed species was recorded also from Senegal, Canary Islands and Madeira (Ritter and Brederlau, 1999; Best, 2007; Perrin and Van Waerebeek, 2012).

Sightings. *Mesoplodon densirostris* has not been observed alive in Mauritanian waters despite surveys in its preferred habitat, including continental and island slopes (Best, 2007). Blainville's beaked whale is probably the most cosmopolitan of (sub)tropical ziphiids (Perrin and Van Waerebeek, 2012; Carwardine, 2020) and Mauritania may be a habitual range state.

***Ziphius cavirostris* G. Cuvier, 1823**

Cuvier's beaked whale; French: Ziphius; Arabic: حوت لِكوفييه ذوالمنقار; Farsi: نهنگ پوزه‌دارکویر

Specimens. The stranding of a Cuvier's beaked whale on Grande Plage at latitude 18°50' N on 07 October 1990 (Robineau and Vély, 1998) is still the only report of this cosmopolitan ziphiid in Mauritania. Although we could not examine the skull (location is unknown), we accept this as a valid record considering the species' characteristic cranial morphology (an extremely high vertex, enlarged nasals overhanging external bony nares; relatively short rostrum, broad at base; large prenarial basin; see Heyning, 1989), and the large size (reported CBL= 855 mm), consistent with an adult male *Z. cavirostris*, renders such a skull unmistakable.

Sightings. Cuvier's beaked whale has not been observed off Mauritania, but is regularly encountered around El Hierro, Canary Islands (Ritter and Wähner, 2011) where deep water is found close to shore. Morocco, Cabo Verde and Senegal are also confirmed range states (Haase, 1987; Perrin and Van Waerebeek, 2012).

Balaenopteridae (Rorquals)

***Megaptera novaeangliae* (Borowski, 1758)**

Humpback whale; French: Baleine à bosse, Mégaptère; Arabic: الحوت ذوالسنام; Farsi: نهنگ گوژپشت

Specimens. A humpback whale was reported stranded in Baie du Lévrier in February 1954 (Cadenat, 1955) and, although unsubstantiated, the species' morphology is unequivocal. A second case, an 8 m juvenile gillnet entanglement victim stranded (probably alive) at Mhajarat (also spelled Mheijrat), some 100 km north of Nouakchott on 01 March 2016 (IMROP, this paper; Fig. 31). The seasonality agrees with the Northeast Atlantic (Cabo Verde) population migration (see Wenzel et al., 2009; Bamy et al., 2010; IMROP, 2013).

Sightings. Four humpback whale sightings have been documented from Mauritanian waters. One flipper-slapping non-adult individual surfaced <200 m from a fisheries survey ship off southern Mauritania on 23 April 2004 (Tulp and Leopold, 2004). In 2012, three winter sightings were made from R/V *Al Awam* (Camphuysen et al., 2012) identified by diagnostic dorsal fins, bushy blows and long flippers: two sightings of single animals on 07 December 2012, and a third sighting of two individuals, apparently feeding and lob-tailing, on 08 December 2012 off the northern Mauritanian coast. The three December observations are consistent with the known winter occurrence at low latitudes of the Northeast Atlantic population, such as off the Cabo Verde islands (Wenzel et al., 2009). No humpback whales were encountered in coastal waters in over 3,995 km of surveys between Conakry–Tangier–Las Palmas in late spring, i.e., May–June 2012 (Djiba et al., 2015). An undated photograph of an evident humpback whale tail is published in IMROP (2013).

Indications are that humpback whales are relatively uncommon in Mauritanian waters at any time, in sharp contrast with their relative abundance off central Senegal, The Gambia, Guinea-Bissau and Guinea during October–November (Bamy et al., 2010; Van Waerebeek et al., 2013). The latter are thought to constitute a Southern Hemisphere population that visits the West African continental shelf as far north as central Senegal (Dakar) in boreal spring and summer months, several with small calves in what is a proposed nursing area (Bamy et al., 2010; Van Waerebeek et al., 2013; Djiba et al., 2015). Irrespective of stock affinity, the potential exists for the year-round presence of a number of humpback whales both breeding and feeding off West Africa thanks to abundant prey availability linked to the high productivity of the CCLME coastal upwelling (Papastavrou and Van Waerebeek, 1998).

***Balaenoptera acutorostrata* Lacépède, 1804**

Common minke whale; French: Petit rorqual; Arabic: حوت المنک الشائع; Farsi: نهنگ مینک معمولی

Specimens. The first Mauritanian record of common minke whale, a 430 cm carcass stranded on la Grande Plage at 18°58' N, 16°32' W (BLM3-94) was identified from cranial features (CBL= 110 cm) and the external morphology (Robineau and Vély, 1998; Van Waerebeek et al., 1999). Our BGP surveys registered three new cases: (Fig. 32): (A) a 417 cm minke whale stranded south of Nouakchott on 23 October 2014 (Fig. 32), (B) a 520 cm specimen bycaught in a gillnet at Mheijrat in March 2018, and (C) a 430 cm specimen found stranded at 19°27' N, 16°47' W in January 2021. Small body lengths are consistent with earlier findings of primarily juveniles and calves of minke whales stranding on the northwest African coast, a proposed breeding/calving ground for the Northeast Atlantic population of *B. acutorostrata* (Van Waerebeek et al., 1999).

Sightings. No *B. acutorostrata* sightings are confirmed in Mauritanian waters; however, among the many unidentified balaenopterids reported, particularly in winter 2014 (Maigret, 1981; Camphuysen et al., 2012; Baines and Reichelt, 2014; Djiba et al., 2015), some may have been minke whales.

Figure 30: Skull of an adult specimen of the Gervais' beaked whale *Mesoplodon europaeus* collected at 17°05'10"50" N, 16°14'53" W in southern Mauritania on 24 December 2021. (A) Ventral view, (B) mandibles with characteristic subapically placed teeth, and (C) dorsal view. Represents second record of *M. europaeus* for Mauritania. Skull curated at IMROP. (Photos © A. S. B., IMROP).

Figure 31: A juvenile humpback whale *Megaptera novaeangliae* of 800 cm body length, stranded alive (but died) at Mhaijrat on 01 March 2016. Superficial incisive lacerations, consistent with fishing gear damage, were present on dorsum and on the trunk laterally. Small, bleeding injuries on the dorsal fin. (Photo © A. S. B.).

Figure 32: North Atlantic common minke whales *Balaenoptera acutorostrata*. (A) Decomposed specimen found at 17°55'07" N, 16°01'59" W on 23 June 2014. Note short, triangular upper rostrum. (B) Specimen net-entangled and stranded at Mhaijrat on 13 March 2019. White flipper patch stands out (Photo © A. S. B.). (C) Carcass stranded at 19°16'43" N, 16°28'43" W on 30 January 2021. Short, sharply triangular rostrum, pale baleen and diagnostic pale flipper patch is still visible. (Photo © A. S. B., IMROP).

***Balaenoptera musculus* (Linnaeus, 1758)**

Blue whale; French: Baleine bleu; Arabic: الحوت الأزرق; Farsi: نهنگ آبی

Specimens. To date, no confirmed blue whale strandings have been documented in Mauritania. The same can be said for Senegal, The Gambia, Guinea-Bissau and Guinea.

Sightings. An adult-sized blue whale was positively identified off Mauritania at 19°22.44' N, 17°04'12" W on 04 April 2012 (Fig. 33) and another one was seen just northeast of the Timiris Canyon system over the Arguin mud wedge on 14 September 2015 (Camphuysen et al., 2015). Ten blue whale sightings, identified from the small dorsal fin and mottled bluish coloration, were observed during a winter survey (November 2012–January 2013) at variable depths (range= 45–1,556 m; mean= 722 m) off Banc d'Arguin (Baines and Reichelt, 2014). Generally, blue whales are thought to be present in CCLME waters during the cooler months from November–April (Djiba et al., 2015) and may represent members of the Northeast Atlantic blue whale stock that feeds off Iceland in summer from May–September (Sears and Perrin, 2009). A group of three blue whales encountered at the continental break (depth 383 m) off The Gambia on 13 May 2013 is the southernmost documented observation of *B. musculus* in the Northeast Atlantic (Plate 5.7.2 in Djiba et al., 2015).

***Balaenoptera physalus* (Linnaeus, 1758)**

Fin whale; French: Rorqual commun; Arabic: الحوت الزعنفی; Farsi: نهنگ بالهای

Specimens. Maigret et al. (1976) reported two cases of small-sized fin whales: a 9.5 m female captured in the Baie de l'Archimède on 29 March 1971 and a 10.2 m female stranded at Nouadhibou on 23 March 1975. However, supporting evidence is lacking and, considering the small body sizes, some concern exists about potential confusion with Omura's whale (*Balaenoptera omurai* Wada, Oishi and Yamada, 2003) with similar coloration (Jung et al., 2015; see below). No authenticated *B. physalus* specimens exist for Mauritania.

Sightings. Similar concerns about species identification apply to three sightings reported as fin whales from 1973–1974 because of a lack of descriptions or photos (Maigret et al., 1976; Maigret, 1980), and because frequently occurring sei whales (*Balaenoptera borealis* Lesson, 1828; see below) were not mentioned. In a winter survey, Baines and Reichelt (2014) reported two fin whales seen together (depth, 856 m). Tulp and Leopold (2004) noted a single animal in April 2004, while Camphuysen et al. (2012) reported four individuals in November and December 2012. Finally, the first convincing photographs were presented by Camphuysen et al. (2017) who documented four sightings (six individuals). No fin whales were sighted in more neritic (and more tropical) CCLME waters surveyed by R/V *Dr. Fridtjof Nansen* (Van Waerebeek et al., 2012; Djiba et al., 2015). Aguilar and García-Vernet (2018) drew the boundary of the primary range of *B. physalus* in the Northeast Atlantic precisely at Mauritania. Fin whales, globally, are rare in tropical waters.

***Balaenoptera borealis* Lesson, 1828**

Sei whale; French: Rorqual boréal, Rorqual de Rudolphi; Arabic: الحوت سای; Farsi: نهنگ سئی

Specimens. Maigret (1981) first identified an 11 m long balaenopterid stranded in the western Baie du Lévrier just north of Nouadhibou on 16 February 1981 as *B. borealis*. However, until recently, voucher material of this species was missing (Maigret, 1981;

Robineau and Vély 1998). Five black baleen plates with pale, fine fringe hairs, diagnostic for *B. borealis* and deposited at IMROP were collected by the first author during a demersal research trawl haul from R/V *Dr. Fridtjof Nansen* at 17°40'12" N, 16°37'48" W on 01 June 2012. Since gum tissue was present, these baleens were either ripped out through a collision of the trawl gear with a live whale or raked up from a submerged carcass (Van Waerebeek et al., 2012; see Plate 5.7.2 in Djiba et al., 2015). Remains of another specimen (condition code 4) washed ashore at 18°54'30" N, 16°10'56" W on 13 January 2013. Photos (IMROP) clearly expose the downward-arched rostrum indicative of *B. borealis*. A third authenticated specimen is a juvenile sei whale stranded dead at the village of Ten-alloul (PNBA) and examined by A. S. B. on 24 November 2014. The single prominent rostral ridge, a large falcate dorsal fin, asymmetric ventral coloration and all-black baleen plates (one measured 50 cm mandibular side, 65 cm lingual side) with pale fringe hairs, confirm the identification (Fig. 34A, B). Finally, the number of ventral pleats was estimated as 44. The most recent case is another individual cast ashore at 18°54'30" N, 16°10'57" W on 03 June 2021 (Fig. 34C).

Sightings. In April 2001, at least two sei whales were observed off Mauritania from a tourist expedition vessel (Prieto et al., 2012). Baines and Reichelt (2014) reported seven confirmed sei whale sightings, identified by their dorsal fin, downward-curved rostra and surface skim-feeding behavior, which are diagnostic (Best, 2007; Carwardine, 2020), in mainly deep waters (mean= 1,233 m) off Banc d'Arguin during a winter survey (November–January). Group sizes ranged 1–18 animals. Combined, the records strongly suggest *B. borealis* to be common and that the species may overwinter off Mauritania or more likely, be present year-round, considering the baleen case in June.

***Balaenoptera omurai* Wada, Oishi and Yamada, 2003**

Omura's whale; French: Rorqual de Omura; Arabic: حوت أومورا; Farsi: نهنگ آمورا

Specimens. A 398 cm calf rorqual washed ashore near Chott Boul, southern Mauritania; it was found on 03 November 2013 and was identified as *B. omurai* by several unusual morphological features and three mtDNA markers (Jung et al., 2015; Mullié et al., 2015). It then represented the first confirmed Omura's whale in the Atlantic Ocean (Jung et al., 2015). We now know that it is a member of a formerly unrecognized Atlantic population since in the meantime another three records, one stranding on the Brazilian coast (Cypriano-Souza et al., 2016) and two records (visual and acoustic) in the offshore equatorial Atlantic, have been reported (Carwardine, 2020).

Sightings. No Omura's whales have yet been recognized alive in Mauritanian or any West African waters. However, many accounts exist of unidentified balaenopterids in late-autumn and winter (Camphuysen et al., 2012; Baines and Reichelt, 2014; Djiba et al., 2015) which could include this species. Geographically, the nearest documented record of *B. omurai* was found far offshore of Brazil (Carwardine, 2020). Considering the distance of more than 2,300 km from Mauritania, it is unclear whether any reproductive connection exists.

Figure 33: Blue whale *Balaenoptera musculus* sighted from R/V *Al Awam* in Mauritanian waters at 19°22'26" N, 17°4'12" W on 04 December 2012. Note bluish mottled skin and non-falcate, small dorsal fin set ¾ of the way along the dorsum.(Photo ©Hans Verdaat).

Figure 34: Two Sei whales *Balaenoptera borealis* stranded freshly dead in Mauritania. (A, B) Dorsal and ventral view, at PNBA National Park on 24 November 2014 with diagnostic all-black baleen with white fringe. (C) Ventral view, individual cast ashore at 18°54'30" N, 16°10'56" W on 03 June 2021. (Photos © A. S. B., IMROP). Note single prominent rostral ridge, mixed pale and dark coloration ventrally.

***Balaenoptera brydei* Olsen, 1913**

Bryde's whale; French: Rorqual de Bryde, Baleine tropicale; Arabic: الحوت البريدى; Farsi: نهنگ برايد

Specimens. No substantiated specimen records of Bryde's whale exist for Mauritania (Maigret et al., 1976; Robineau and Vély, 1998; Van Waerebeek and Jiddou, 2006; this paper). While an incomplete skeleton at the Nouamghar PNBA station was flagged as a potential specimen (Robineau and Vély, 1998), no supporting arguments were mentioned; thus, for now it remains a *species indeterminata*.

Sightings. Camphuysen et al. (2012) reported three balaenopterid sightings in December 2012 as "probably" Bryde's whale, and one as Bryde's for which they noted "clear and fairly tall but thin blow, sickle shaped dorsal, not as tall and 'nicked' as in sei whale". However, considerable overlap exists in dorsal fin shape between sei, Bryde's, Omura's and Eden's (*B. edeni* Anderson, 1879) whales, impeding positive species identification at sea if it is the only characteristic observed (Best, 2007; Carwardine, 2020). Sei and Bryde's whales are frequently confused as the two species can be frustratingly difficult to tell apart in typical situations (Jefferson et al., 2008). Much of the literature on Bryde's and sei whales, still to this day, contains identification errors (Jefferson et al., 2008). Hence, we consider the above-mentioned sightings 'possible' Bryde's whale records until authenticated. Baines and Reichelt (2014) reported 238 cetacean sightings off Mauritania, 70% of which were large whales. However, "on no occasion was the potentially sympatric Bryde's whale specifically identified", while on seven occasions sei whales were positively identified thanks to multiple characters observed (Baines and Reichelt, 2014).

Table 1: Summary list of cetacean species from Mauritanian waters, including 27 fully authenticated species and three species that most probably occur.

Family	Fully authenticated Species	Probable Species
Balaenopteridae		
	Balaenoptera acutorostrata	*Balaenoptera brydei*
	Balaenoptera borealis	
	Balaenoptera musculus	
	Balaenoptera omurai	
	Balaenoptera physalus	
	Megaptera novaeangliae	
Delphinidae		
	Delphinus delphis	*Globicephala melas*
	Globicephala macrorhynchus	*Peponocephala electra*
	Grampus griseus	
	Lagenodelphis hosei	
	Orcinus orca	
	Pseudorca crassidens	
	Sousa teuszii	
	Stenella attenuata	
	Stenella clymene	
	Stenella coeruleoalba	
	Stenella frontalis	
	Stenella longirostris	
	Steno bredanensis	
	Tursiops truncatus	
Kogiidae		
	Kogia breviceps	
	Kogia sima	
Phocoenidae		
	Phocoena phocoena	
Physeteridae		
	Physeter macrocephalus	
Ziphiidae		
	Mesoplodon europaeus	
	Mesoplodon densirostris	
	Ziphius cavirostris	

Discussion

The complex oceanography of Mauritanian waters (Valdés and Déniz-González, 2015) permits a mixed assemblage of cetacean fauna with the distribution of cool temperate odontocetes like *Phocoena phocoena* and (probably) *Globicephala melas* overlapping with that of (sub)tropical species such as *Sousa teuszii*, *Stenella clymene* and *Stenella frontalis*. The tally of cetacean species richness has steadily increased over the years. Maigret (1976) listed 10 species and Robineau and Vély (1998) reported 21 species for the area. A succinct review by Perrin and Van Waerebeek (2012) listed 16 small cetacean species. Russell et al. (2018) reported 16 species observed during a geophysical survey between September and December 2012.

The present updated checklist includes two new species records that have not previously been reported for Mauritanian waters: *Kogia sima* and *Lagenodelphis hosei*. *Stenella coeruleoalba* is verifiably documented for the first time. Also, a first specimen record of *Stenella longirostris* is presented, as well as second specimen cases for *Mesoplodon europaeus, Steno bredanensis* and *Megaptera novaeangliae.*

The final tally of reported cetacean diversity in Mauritanian waters then amounts to 30 cetacean species, including 23 odontocetes and 7 mysticetes. Of these, 27 species are verifiably authenticated and thus fully confirmed and 3 (*Globicephala melas*, *Peponocephala electra*, *Balaenoptera brydei*) are 'species probably present', i.e., have been reported but are lacking scientifically verifiable voucher material, including lost or (equivalent) inaccessible material. However, the list of cetacean species reported in the tropical and subtropical Northeast Atlantic (from Madeira to Senegal) includes 34 species (Robineau and Vély, 1997).

Finally, collectors are urged to deposit valuable specimens in Mauritanian collections, as to enhance the national natural heritage and contribute to marine mammal science and conservation within the country.

Odontocetes

At least one delphinid with a pantropical distribution and two ziphiids are so far unknown from Mauritania but documented from other northwest African range states including the Canary Islands (Spain) and Cabo Verde (Perrin and Van Waerebeek, 2012) and will likely be encountered some day. These include pygmy killer whale *Feresa attenuata* Gray, 1874, known from a stranding on Boavista Island, Cabo Verde (López-Suarez et al., 2012), True's beaked whale *Mesoplodon mirus* True, 1913, registered in the Azores and Canary Islands and Sowerby's beaked whale *Mesoplodon bidens* (Sowerby, 1804), also in the Canary Islands (reviewed in Perrin and Van Waerebeek, 2012). For the 21 fully supported (of 23 reported) Mauritanian odontocetes, the level of evidence differs among species, most are authenticated by specimens stranded or captured, others by direct observations at sea.

West Africa constitutes the southern distribution limit of *P. phocoena* (Jefferson et al., 1997; Van Waerebeek et al., 2000; Fontaine et al., 2014), and forms the habitat of the world's most southern population that ranges from Agadir, central Moroccan coast, to at least Fadiouth in southern Senegal and likely Banjul, The Gambia, as reported from occasional bycatches (Cadenat, 1956; Van Waerebeek et al., 2000, 2003). Linked to the CCLME upwelling, porpoises are very rare south of the Casamance River where the warm Guinea Current predominates (Van Waerebeek et al., 2000). Distributional support for discreteness consists of an apparent distribution gap of some 895 km from Cabo de Espichel (38°24'51" N, 09°13'21" W), southern Portugal, over the Strait of Gibraltar south to Agadir (Robineau and Vély, 1998; Van Waerebeek et al., 2000). The Mauritanian population is thus reproductively isolated from the other populations in the Northeast Atlantic. Porpoises from the upwelling zones off Iberia and Mauritania have recently been identified as genetically divergent from *P. p. phocoena* and *P. p. relicta* (Abel, 1905) (Black Sea population), based on DNA sequence analysis of a quarter of the mitogenome (Fontaine et al., 2007; Fontaine, 2016). Porpoises in Mauritania also have a larger mean body size and skulls with greater condylobasal lengths (Smeenk et al., 1992; K. V. W., unpublished data).

During beach monitoring from 2012–2016, we counted 321 harbor porpoises stranded along the Mauritanian coasts, most of them south of Nouakchott. Two mass mortality events were recorded, one in June 2014 (80 specimens) and another in June 2016 (46 specimens). Several specimens were lacking tailstocks or dorsal fins, indicative of bycatch victims (Geraci and Lounsbury, 2005), as carcasses are deliberately mutilated to facilitate removal from fishing nets. Cases of bycatch have regularly been reported in Mauritania and Senegal for decades (Cadenat, 1949; Fraser, 1958; Maigret, 1980, 1981; Van Waerebeek et al., 2000, 2003; Mullié et al., 2013).

The Atlantic humpback dolphin is endemic to the tropical and subtropical eastern Atlantic inshore waters in West and Central Africa (Van Waerebeek et al., 2004; Weir et al., 2011). A review applying the International Union for Conservation of Nature (IUCN) criteria and based on its restricted geographic range, low abundance and apparent decline considered *Sousa teuszii* 'Critically Endangered' (Collins, 2015). Of the eight management stocks defined by Van Waerebeek et al. (2004), the population size for each does not seem to exceed tens to a few hundred animals. The known distribution is discontinuous, for instance from Ghana to Sierra Leone, possibly due to local extirpation following decades of bycatch, directed takes and nearshore habitat degradation (Van Waerebeek et al., 2004, 2017; Weir et al., 2011; Ayissi et al., 2014; Collins, 2015). In Mauritania, the principal distribution of *Sousa teuszii* is centered at the PNBA marine park with relatively few records from surrounding areas, from Baie du Lévrier

and Baie de l'Etoile in the north to Cap Timiris and Nouamghar in the south (Maigret, 1980; Robineau and Vély, 1998; Van Waerebeek et al., 2004). The limited information available on abundance and small-scale distribution is dated by 2–3 decades (Maigret, 1980; Robineau and Vély, 1998). A 3-day boat survey covering 226 nm in and around PNBA in November 2006 encountered abundant *T. truncatus* but not a single humpback dolphin (Van Waerebeek and Jiddou, 2006). New boat surveys are urgently required to evaluate the status of the Banc d'Arguin stock, as well as the tiny, apparently isolated Dakhla stock to the north in Western Sahara. In Mauritania, bycatch in small-scale coastal fisheries is the primary culprit of anthropogenic mortality for humpback dolphins as it is throughout its range (Van Waerebeek et al., 2004; 2017; Van Waerebeek and Perrin, 2007; Bamy et al., 2010; Collins et al., 2010; Weir et al., 2011; Collins, 2015).

All examined pilot whales in the Canaries have been *Globicephala macrorhynchus* based on both close-up observations and molecular genetics (Boehlke, 2006; Ritter and Wähner, 2011; Miralles et al., 2013; K. V. W., pers. observations), and we found no firm evidence for *G. melas* in Mauritania (this paper), as was the case for Cabo Verde (Van Waerebeek et al., 2008). Nonetheless, we deem the occasional presence of *G. melas* off Mauritania quite likely. Miralles et al. (2013) demonstrated that, rarely, hybridization may occur off northwest Africa, but the location of interspecific breeding events is unknown.

During this study we inventorized five species of the genus *Stenella* for Mauritania: *S. frontalis*, *S. attenuata*, *S. clymene*, *S. longirostris* (first specimen records) and *S. coeruleoalba* (first supported records). Most observations of stenellids were registered during the R/V *Al-Awam* surveys during 2012–2016 (Camphuysen et al., 2012, 2015, 2017) and a geophysical survey (Russell et al., 2018).

Stenella frontalis accounted for the majority of these. Robineau and Vély (1998) cited two stenellids for Mauritania, *S. clymene* and *S. coeruleoalba*, based on (unverifiable) cranial material. The rarity of *Stenella* sp. records is explained by their thermal preference for warmer offshore waters. Stenellids were generally observed beyond the continental slope in areas with water depths greater than 400 m. Russell et al. (2018) observed *S. frontalis* at depths greater than 2,000 m during 70% of all encounters and showed a narrower range of water depth (1,086–2,948 m). Most observations of *S. frontalis* made during BGP surveys (Camphuysen et al., 2012, 2015, 2017) also occurred in deep waters (277–1,376 m) with a high sea surface temperature (27.5–29.7 °C). Although not mentioned, we assume that most of these were the mostly unspotted offshore form (see Fig. 10). Groups of 560 *Stenella clymene* individuals were observed in a water depth of 1,012 m (Camphuysen et al., 2015) and 673–3,169 m (Russell et al., 2018). Van Waerebeek and Perrin (2007) recommended that the West African population of Clymene dolphins be added to Appendix II of the Convention on the Conservation of Migratory Species of Wild Animals (CMS), considering the relative scarcity of the species in western African waters and the high bycatch rates in Ghana (Van Waerebeek et al., 2009).

The short-beaked common dolphin ranks among the most frequently encountered cetaceans on the Mauritanian coast. Robineau and Vély (1998) indicated that *D. delphis* represented 21% of cetacean strandings (individuals), ranking second only to *T. truncatus*. However, at sea, common dolphins were by far the dominant marine mammal sighted, accounting for (a minimum) of 28.7% of cetacean sightings in coastal waters of northwest Africa (Djiba et al., 2015) and represented three quarters (71.3%–76.5%) of the total number of individual cetaceans observed. It was both the most numerous and most frequently encountered oceanic dolphin species observed in 2012 (910 individuals), 2015 (3,170 individuals) and 2016 (2,772 individuals) that occurred in 366–1,239 m depth water and with sea surface temperatures (SST) averaging 23.9 ± 2.3 °C (Camphuysen et al., 2012; 2015). However, Maigret (1980) reportedly observed four groups from Nouakchott beach, i.e., in shallow water, in June, July, August and September.

There is little information on the occurrence of a long-beaked form of common dolphin on the Mauritania coast, bar a unique citation by Russell et al. (2018). Van Waerebeek (1997) reported 12 skulls of a long-beaked form from Senegal deposited at the Zoological Museum of the University of Amsterdam (now at Leiden Natural History Museum). While initially assigned to *D. capensis* and considering the cogent taxonomic analysis by Cunha et al. (2015), these specimens may be explainable by the wide phenotypic variation in *D. delphis*. However, this may not necessarily apply to long-beaked forms off central and southwest Africa (Van Waerebeek, 1997).

Apart from the Fraser's dolphin skull reported here, in continental northwest Africa only one other both cranially and physically mature specimen is known; this was from Senegal's Sangomar Island, collected 17 November 1997 (Van Waerebeek et al., 2000). Although destroyed in a fire, photos remain in CEPEC archives (see Fig. 8 in Van Waerebeek et al., 2000). The scarceness of Fraser's dolphin in the CCLME is unsurprising considering it is a strictly tropical, oceanic species, which is common in the Gulf of Guinea (Van Waerebeek et al., 2009; Debrah et al., 2010; de Boer et al., 2016).

Mysticetes

Although fin whales occur in all oceans, the species is scarce in equatorial regions and generally the tropics (Best, 2007). The population occupying the western basin of the Mediterranean Sea is largely resident (Aguilar and García-Vernet, 2018). Bayed and Beaubrun (1987) stated that since 1960 no fin whale records exist for Morocco but reminded thatdozens of fin whales were taken from the Benzou land station from 1949–1954 (Aloncle, 1964). Mauritania appears to form the southernmost range

boundary in the Northeast Atlantic and fin whales probably belong to the Spain–Portugal–British Isles subpopulation (Jefferson et al., 2008; Aguilar and García-Vernet, 2018). No confirmed fin whale strandings are known for Mauritania. Two reports of strandings in Senegal (Dupuy and Maigret, 1980; 1982) were made but neither were corroborated. Despite appreciable shipboard survey effort off Guinea (Bamy et al., 2010; Van Waerebeek et al., 2013; Djiba et al., 2015), fin whale was never sighted.

In conclusion, at least six (humpback, blue, fin, sei, common minke, Omura's whale), and probably seven (including Bryde's), mysticete species are distributed in Mauritanian waters. We counted 40 stranded whales between 2013 and 2021, among them three juveniles (2 minke, 1 humpback whales). The cause of death for most whales could not be determined, as most were in an advanced state of decomposition, and the logistics for necropsy were unavailable. Robineau and Vély (1998) reported four species (*Balaenoptera physalus*, *B. borealis*, *B. acutorostrata* and *Megaptera novaeangliae*) with a single observation for each one of them. Russell et al. (2018) reported 72 whales divided over four species and unidentified large whales. During the seabird and marine mammal surveys off Mauritania, 51 large whales were observed (Camphuysen et al., 2012; 2015; 2017).

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Author contributions

Conceptualization and planning of the paper was initiated mainly by A.S.B. and K.V.W. Field work during the BGP program (i.e. ship-board and beach survey efforts) which yielded most new data, and allowed specimen collection and processing, was implemented by A.S.B., M.M.W., A.W. and A.D. Additional field data were contributed by all authors over several years, supported by IMROP. Taxonomic authentication of specimens and photographic evidence, involving museum work, was effectuated by A.S.B. and K.V.W. Data analysis, literature searches and writing of the manuscript was undertaken by all authors, with a leading role by A.S.B and K.V.W.

Conflict of interest

All the authors declare that there are no conflicting issues related to this review article.

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