Three sightings of *Mesoplodon* species in the Bay of Biscay: first confirmed True's beaked whales (*M. mirus*) for the north-east Atlantic?

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Three sightings of *Mesoplodon* beaked whales are reported from the Bay of Biscay, north-east Atlantic. All sightings comprised one or two animals, breaching repeatedly in proximity to the survey vessel, and occurred at between 2200 and 4100 m water depth. Descriptive and photographic data are compared with published accounts of *Mesoplodon* species in the north-east Atlantic, and the identification of the animals as True's beaked whale (*Mesoplodon mirus*) concurs with all observed features. Within the north-east Atlantic, True's beaked whale is the only *Mesoplodon* species that could produce the single, closely-spaced parallel-paired scar observed on one animal. Our observations are consistent with the first live sightings of True's beaked whale in the Bay of Biscay, and only the second documented record worldwide.

INTRODUCTION

Of all cetacean species, the beaked whales (Cetacea: Ziphiidae) are among the most poorly understood, with the distribution of many species known only from stranded specimens (Mead, 1989). Within this family, the genus *Mesoplodon* consists of approximately 14 species of morphologically similar species that inhabit deep (>200 m) oceanic waters, and are consequently rarely observed. The identification of stranded *Mesoplodon* relies largely on the shape of the skull and dentition, features that are not conducive to at-sea identification (Moore, 1966; Mead, 1989). Most *Mesoplodon* species possess a single pair of functional teeth that only erupt from the gums in adult males, forming tusks that protrude visibly from the closed mouth (Moor, 1966). The position of the teeth along the lower jaw varies in a species-distinct manner (Moor, 1966; Mead, 1989), providing a positive identification feature when viewed at close range.

Within the North Atlantic, four species of *Mesoplodon* have stranded with regularity, Sowerby's beaked whale (*M. bidens*), Blainville's beaked whale (*M. densirostris*), Gervais' beaked whale (*M. europaeus*) and True's beaked whale (*M. mirus*) (Moore, 1966; Macleod, 2000). Of these, only Sowerby's and Blainville's beaked whales have been repeatedly encountered and identified at sea, providing opportunity to study their morphology and behaviour (e.g. Hooker & Baird, 1999; Ritter & Brederlau, 1999). In contrast, Gervais' and True's beaked whales are difficult to separate from one another and have rarely been positively identified at sea. A group of three *Mesoplodon* identified as Gervais' beaked whale were observed in the Canary Islands during January 1998 (Carrillo & Martin, 1999), and single sightings of *Mesoplodon* thought to be True's beaked whale have been reported from North Carolina (Tove, 1995), and the Azores (L. Steiner, personal communication).

Here we report on three sightings of *Mesoplodon* beaked whales in the Bay of Biscay, north-east Atlantic, and discuss the likely identification of these animals as True's beaked whales.

MATERIALS AND METHODS

All observations were made from a 177 m long ferry, the ‘Pride of Bilbao’, which transits across the Bay of Biscay twice weekly between Portsmouth, England and Bilbao, Spain at speeds of 15–22 kn. The Biscay Dolphin Research Programme (BDRP) and AMBAR have carried out cetacean surveys from this platform on a monthly basis since 1995 (Williams et al., 1999).

During survey work, observers were located on the bridge and/or the observation deck of the ferry, both at 32 m eye height. All sightings occurred during dedicated cetacean surveys, where observers were searching actively with the naked eye supplemented by binocular scans (8–10×). Field notes, positional and environmental data were logged continuously.

During Sighting 1 photographs were taken from the observation deck using a Canon EOS camera with a full-zoom 300 mm lens and Fuji Sensia 100 ASA film. The second sighting was recorded using a Canon SLR Digital Camera with a Canon 70–200 mm lens set at 70 mm.

OBSERVATIONS

The sightings were recorded between July 2001 and September 2003, and are referred to throughout this paper as Sighting 1–3 respectively.

**Sighting 1**

A single *Mesoplodon* whale was observed on 9 July 2001, approximately 45 km north of the Spanish coast in the
southern Bay of Biscay (43°52.82'N 03°19.90'W; water depth: 2200 m). Sighting conditions were good (Beaufort sea state 2–3, 5 m swell, over 20 km visibility). The animal made a series of over 24 breaches at intervals of 20–60 s, commencing 150 m to the side of the vessel and continuing over a 12 min period until over 6 km astern of the ship. Breaching behaviour involved the whale leaping vertically at an angle of 80° from the water and falling back onto its side, with the tail flukes remaining submerged (Figure 1). The animal was estimated at 4.5 m in length and the overall body shape was similar to that of a large bottlenose dolphin (Tursiops truncatus). However, the robust body tapered to a narrow tailstock and a prominent spinal ridge was visible posterior to the small, triangular dorsal fin. A distinct dorsal indentation was apparent at the location of the blowhole (Figure 1). The head was less dorsally-flattened than most mesoplodonts, with a well-rounded melon and a forehead which sloped steeply to a short and robust rostrum. Throat grooves characteristic of all Mesoplodon species are visible in Figure 1C.

The coloration of the animal was a uniform blue-grey, with darker pigmentation along the dorsal surface, around the genital slit, on the flippers and as a dark oval patch surrounding the eyes. In contrast, the head pigmentation was light, with pale/white coloration extending dorsally and anterior to the eye patch including the posterior portion of the melon (Figure 1B). The tip of the rostrum appeared white (Figure 1A), but it was not possible to ascertain whether this resulted from erupted teeth, reflected sun glare or natural pale coloration. The jaw line was relatively straight, but curved slightly upwards and back towards the eye on reaching the forehead.

Of particular significance was the presence of scarring on the lower left-hand flank of the whale (Figure 2). Three scars were visible; a pair of symmetrical scars orientated parallel to one another, and a single scar lower down the flank.

Figure 1. Mesoplodon beaked whale observed on 9 July 2001: (A) start of breach, dorsal view; (B) mid-breach, dorsal view; (C) end of breach, flank and ventral view (Photographs by J. Stokes).

Figure 2. Enhanced image of Figure 2C showing scarring on lower flank of Mesoplodon beaked whale (Photograph by J. Stokes).

The second sighting occurred on 1 September 2003 in the central Bay of Biscay approximately 180 km north of Santander, Spain (45°04.70'N 03°53.24'W; water depth: 4410 m). Sighting conditions were good (Beaufort sea state 2–3, over 20 km visibility).

A Mesoplodon whale was observed in a sequence of nine breaches at intervals of 5–7 s, commencing 550 m from the vessel. The initial breach occurred forward onto the ventral surface (Figure 3A), and presented a rather slim and tapered body shape, with a distinct rostrum but poorly defined melon. The further two photographs portray a more robust animal similar to Sighting 1, with a Tursiops-shaped profile and well-rounded melon with distinct short and rounded rostrum (Figure 3B, C).
The whale was estimated at 4.5 m length and, in contrast to Sighting 1, showed a two-tone body coloration with a pale/white ventral surface (Figure 3B,C). The upper body coloration appeared as dark brown in Figure 3A, but pale grey in Figure 3B and C. All photographs show relatively darker pigmentation on the flippers, dorsal fin, as a narrow dorsal ridge and as dark patches around the eyes. The head coloration was contrastingly pale, with a white lower jaw and light pigmentation occurring anterior to and dorsally of the eye, and extending in a narrow band over the dorsal surface in the region of the blowhole (Figure 3A,C). The tip of the rostrum was noticeably white in Figure 3A but not so in Figure 3B and C, and since additional sun reflection was also apparent around the head region in Figure 3A we were unable to determine the presence of erupting teeth.

**Sighting 3**

On 7 September, two *Mesoplodon* whales were observed on the northern shelf edge of the Bay of Biscay (46°06.06′N 04°37.54′W; water depth: 2200 m), 190 km south of the Brittany coastline. Sighting conditions were moderate (Beaufort sea state 3, 1–2 m swell, 12 km visibility). Unfortunately, no photographs were taken during the sighting.

The whales emerged from the water in a series of nine breaches at intervals of about 10 s, moving parallel with and opposite to the vessel trackline and at a distance of 180 m. On all occasions the animals breached forwards out of the water at an angle of about 60° before falling back onto their bellies or sides, and breaching was often near synchronous. The animals differed in size, with the larger animal estimated at 4.8 m and the smaller animal at 3.9 m.

Both whales showed the *Tursiops* body shape, small dorsal fin and prominent beaks seen during Sightings 1
and 2, and had brown-grey coloration with contrasting paler belly and lower flank regions. A darker dorsal ridge extended from the melon to the dorsal fin. Dark oval patches surrounded the eyes and contrasted notably with the white/pale coloration on the lower head, forward of the eye patch, and extending onto the lower rostrum. The whales both had well-rounded melons and short, well-defined rostrums. No visible teeth were noted, despite being specifically looked for.

**DISCUSSION**

The most frequently recorded Ziphiids in the Bay of Biscay are the northern bottlenose whale (*Hyperoodon ampullatus*) and the Cuvier’s beaked whale (*Ziphius cavirostris*) (Williams et al., 1999). However, the animals described here presented significantly different morphological features from either of those species and were clearly *Mesoplodon* whales. Since the animals lacked the long, slender beak of Sowerby’s beaked whale or the steeply-arched jaw-line of Blainville’s beaked whale, we believe that the sightings described here can be one of only two *Mesoplodon* species, the Gervais’ or the True’s beaked whale. Stranding records suggest that both species occur in the Bay of Biscay (Moore, 1966; Macleod, 2000), despite an absence of confirmed sightings.

Positive identification of and separation between Gervais’ and True’s beaked whales at sea is difficult, with both species having similar overall length and shape, body coloration, short rostrum and dark eye patches (Mead, 1989). We were unable to conclusively locate erupting teeth on any of the Bay of Biscay *Mesoplodon* during either field observations or subsequent photographic analysis. However, in the absence of visible teeth there are several further subtle differences in the morphology of both species that might facilitate positive species identification.

Intraspecific variation does occur within *Mesoplodon* species, for example Sowerby’s beaked whale shows notable variation in rostrum length due to ontogenetic development of the sphenys with ageing (Macleod & Herman, in press). However, one distinctive identification feature that appears to differ consistently between True’s and Gervais’ beaked whale is the relative shape of the forehead. This feature was used by Tove (1995) who based his identification of True’s rather than Gervais’ beaked whale upon the prominent dolphin-like beak, rounded melon, and lack of lateral flattening of the head (Tove, 1995). The heads of stranded True’s and Gervais’ beaked whales are shown in Figure 4. The head profile of True’s beaked whale is similar to *Tursiops*, with a well-rounded melon and a forehead that slopes steeply into a short rostrum with a slightly curved jaw-line (Figure 4A). In contrast, Gervais’ beaked whale exhibits a dorsally-flattened head, only slightly rounded melon and a shallow-sloped (almost diagonal) forehead profile from the melon to the tip of the rostrum (Figure 4B). Despite some variation in appearance according to observation angle, all of the *Mesoplodon* whales described here from the Bay of Biscay exhibited well-rounded melons, steeply-sloping foreheads and well-defined rostrums which are consistent with the head shape of stranded True’s beaked whale (Figure 4A) and considerably different to that of Gervais’ beaked whale (Figure 4B).

Further indication of species identification is provided by the visible parallel scar on one whale (Figure 2), which could only be produced by an animal with two teeth protruding at the tip of, or dorsally to, the rostrum. In contrast, stranded Gervais’ beaked whales demonstrate linear scarring (Debrot & Barros, 1992), consistent with a species whose teeth do not protrude above the rostrum. Only two north-east Atlantic *Mesoplodon* species, the True’s and the Blainville’s beaked whales, are capable of producing parallel scars (C. Macleod, personal communication). However, in Blainville’s beaked whale the teeth are located midway along the lower jaw (Mead, 1989), resulting in more widely spaced scarring than that evident in Figure 2. Only an animal with two teeth protruding close to the tip of the rostrum could produce such narrow-spaced parallel scars, and of the north-east Atlantic *Mesoplodon* species only the True’s beaked whale has corresponding dentition. Similar scarring also occurs in Cuvier’s beaked whale, the males of which possess comparable shaped and positioned teeth to True’s beaked whale. Since the majority of scarring on *Mesoplodon* whales is assumed to result from intraspecific interaction (Heyning, 1984), the individual photographed in Figure 1 is likely to be the same species of *Mesoplodon* as the animal which produced the scar. The general lack of scarring on the animals described here might indicate that they were not mature males or that this species is less interactive or generally less susceptible to scarring than other *Mesoplodon* species.

Although the apparent overall body coloration of each individual varied according to the light conditions and observation angle, the relative contrasts of the dark dorsal blaze, pale head coloration and dark eye patches were independently and consistently noted in all of the Bay of Biscay animals. The external pigmentation of many *Mesoplodon* species including both True’s and Gervais’ beaked whales is currently described predominantly from dead stranded animals, the coloration of which changes rapidly upon death (Mead, 1989). If confirmed during future sightings, the pigmentation patterns described here suggest that some *Mesoplodon* species may be more readily identifiable in the field than previously realized. *Mesoplodon* species are usually considered to be undemonstrative and inconspicuous when surfacing (Hooker & Baird, 1999; Ritter & Brederlau, 1999), and Tove (1995) noted active vessel avoidance behaviour by True’s beaked whale off North Carolina. In contrast, the Bay of Biscay sightings all involved prolonged bouts of agile breaching behaviour in close proximity to the vessel, the context of which is unknown.

The three sightings of *Mesoplodon* whales reported here are consistent with the first at-sea sightings of True’s beaked whale in the Bay of Biscay, and only the second documented record worldwide. An earlier two ‘probable’ sightings of this species were reported in the Bay of Biscay during July 1997 and September 1999 (P. Coles, personal communication). The scarcity of sightings despite extensive survey coverage in the Bay of Biscay (Williams et al., 1999) suggests that these animals may be genuinely uncommon within the region compared with other beaked whale species.

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REFERENCES


