

Rediscovery of Fraser's Dolphin *Lagenodelphis hosei*

F. C. FRASER¹ described *Lagenodelphis hosei* in 1956 from a skeleton collected by E. Hose² before 1895 on a sea beach in Sarawak. There have been no further records of the species, and its external appearance has remained unknown. We report here the nearly simultaneous, very recent rediscovery of the species in three widely separated areas of the world, and describe its external coloration and form.

On January 27, 1971, at 5° N latitude, 95° 45' W longitude (approximately 800 km west of Cocos Island in the eastern tropical Pacific), the catch of the seiner M/V Larry Roe included approximately twenty-five dolphins of a type unknown to the fishermen. A US National Marine Fisheries Service observer aboard photographed a large male (Fig. 1a and b) and collected a small calf (Fig. 1c and d) of these dolphins. On May 20, 1972, at 5° N latitude, 122° 22' W longitude (about 2,560 km west of the 1971 locality), three more dolphins of the same type, all females, were captured in a net set on yellowfin-tuna. The specimens, heavily damaged, have been acquired by the Museum of Comparative Zoology, Harvard University.

On February 17, 1971, at 30° 47' S latitude, 30° 58' E longitude (approximately 80 km south of Durban, South Africa), Best, Gambell, and Ross collected a pregnant female dolphin of an unfamiliar species (Fig. 1e and f). Two days later, at 30° 09' S latitude, 32° 20' E longitude an adult male of the same species (Fig. 1g) was collected. On February 17, 1972, another specimen, an immature female (Fig. 1h and i) was taken in the same area, at 29° 33' S latitude, 32° 12' E longitude.

On March 1, 1971, an adult female dolphin (Fig. 1j and k) of a species unfamiliar to local residents was washed ashore at Coffs Harbour, New South Wales, Australia (30° 10' S latitude, 153° 10' E longitude). D. H. Brown collected the specimen and forwarded it frozen to the University of Sydney.

We have compared the prepared skeletons of the 1971 South African specimens and the eastern Pacific calf with photographs and a partial cast of the type specimen of *L. hosei* and conclude that they belong to that species. The adult specimens (Table 1) agree closely with the type in meristics, measurements, and proportions (the two skulls bracket the type in over half of the proportional measurements), and the

diagnostic features of the genus and species are clearly present (Fig. 2), namely, (generic characters) "general structure of skull including tympano-periotic bones as in *Lagenorhynchus* but rostrum having a pair of deep grooves on the palatal surface and fusion of the premaxillae in the middle line dorsally . . . in the manner of *Delphinus* but not of the same extent," and (specific characters) ". . . about 8 feet [2.5 m] long, with broad cranium and basal width of rostrum about 53% of rostrum length. Rostrum flattened, premaxillae not conspicuously raised above level of adjacent maxillae and not varying much in width throughout their rostral length. Post-temporal fossae of moderate size and suboval in shape. Teeth R 44/42 L 43/ca40. Lower jaw rami with a low rounded keel in the neighbourhood of the symphysis. Teeth length 13.6–17.3 mm, their greater diameter 3.9–4.6 mm and lesser 2.4–3.7 mm. Vertebral formula—cervical, 7; thoracic 15, lumbar 21; caudal 37—total number 80 (correct within one or two)."¹

Agreement in meristics is well within the limits of individual variation to be expected on the basis of the range of variation for other, better-known delphinids. The premaxillae of the female specimen are not fused, but incipient fusion is indicated by convergence of the bones, as in young specimens of *Delphinus*. The calf agrees well with the type in meristics, the palate is grooved and the premaxillae converge. The skeletons of the eastern Pacific specimens collected in 1972, the Australian specimen and the third South African specimen have not yet been examined, but we refer them also to *L. hosei* on the basis of their close similarity with the other South African and the earlier eastern Pacific specimens in the distinctive colour pattern and in the external size and shape.

Fraser named his new genus *Lagenodelphis* because the skull of the type possesses features of the genera *Lagenorhynchus* and *Delphinus*. *L. hosei* is in some respects intermediate in external shape (Table 2) as well. The snout is short as in

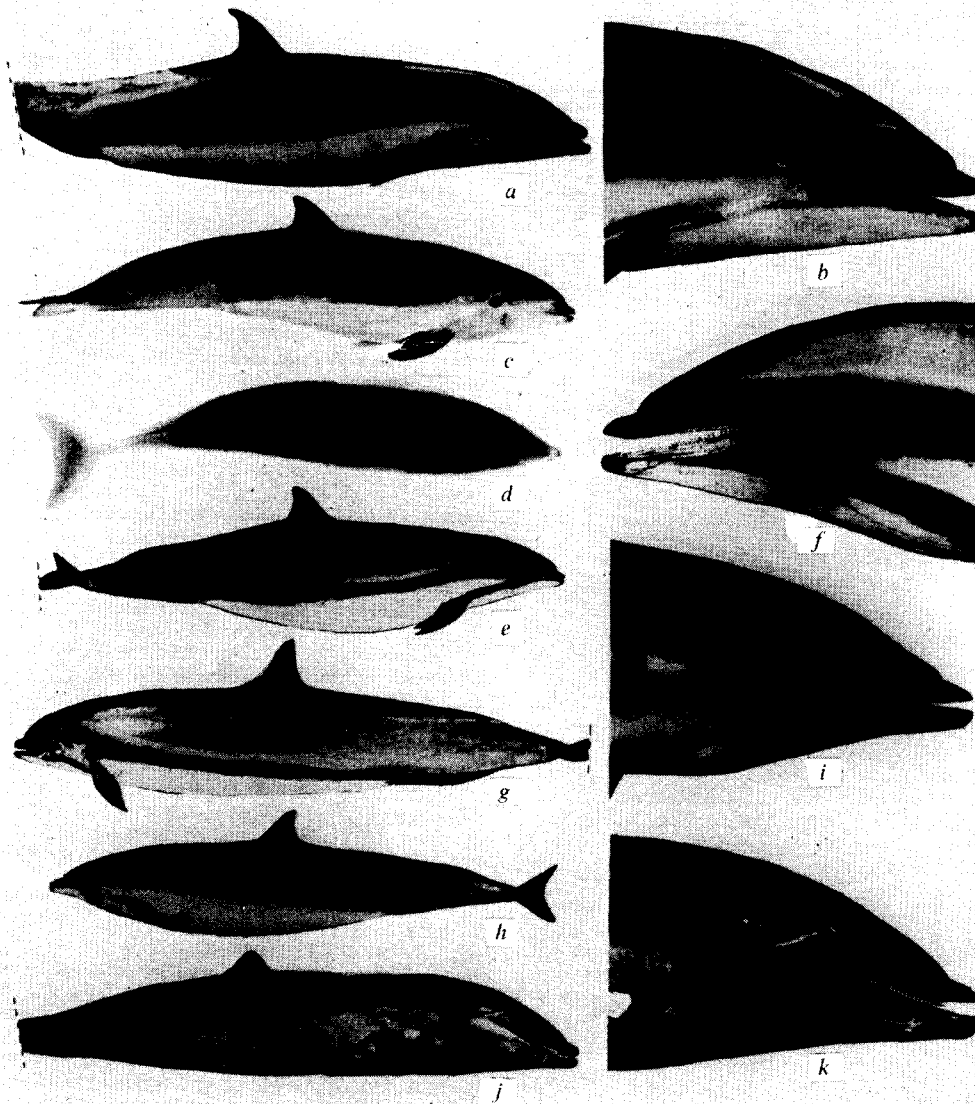


Fig. 1 a and b, Specimen LR22, male, 226 cm, from eastern Pacific. c and d, Specimen LR23, male, 110.2 cm, from eastern Pacific. e and f, Specimen PBB71/3 (SAM 36322), female, 236 cm, from off Natal, South Africa. g, Specimen PBB71/4 (SAM 36323), male, 264 cm, from off Natal, South Africa. h and i, Specimen PBB72/2 (PEM1517/93), female, 225.9 cm, from off Natal, South Africa. j and k, Specimen from off N.S.W., Australia, female, 226 cm.

Lagenorhynchus but well defined as in *Delphinus*. The overall build is relatively robust as in *Lagenorhynchus*, but the size and form of the appendages are as in *Delphinus*. The dorsal fin is only weakly falcate.

In a letter from Charles Hose to Sir Sidney Harmer dated October 23, 1923¹, the skin colour of the type specimen was described as "greyish or whitish yellow in parts, one might almost say cream colour, but a greyish brown in other parts. . . . The colour is difficult to describe, and it is more than twenty-five years ago." Hose's brother claimed that he had collected this specimen, and noted: "As far as I remember, it was not possible to recognize the colour of the skin, it was so very decomposed"². The coloration of *Lagenodelphis* can therefore be considered as unknown. From colour transparencies of the new specimens, it can now be described as follows.

The most obvious feature is a single dark grey lateral stripe. The dorsum above the lateral stripe is dark greyish blue with a brownish hue, and the dorsal fin and both sides of the flippers and tail flukes are similarly coloured. There was a light patch in the centre of the dorsal fin of the large eastern Pacific specimen (Fig. 1a). The ventrum is white tinged with pink in the living and very recently killed animal. A typical delphinid bridle (terminology of Mitchell³) is present, with eye patch, eye stripe, blowhole stripe, and lip patch. There was a definite light grey-blue beak blaze in all animals except the calf, in which there was a suggestion of one. This blaze was bilaterally symmetrical, leaving a narrow strip of dark pigment in the midline of the beak. The blaze compresses the lip patch to a V-shaped patch at the tip of the snout and a narrow line around the edge of the gape, which connects with a similar V-shaped patch at the tip of the lower jaw.

The pattern may be considered in terms of interacting components, as has been done for other delphinids⁴, as a basic "cape pattern" and a "dorsal field overlay". The ventral margin of the cape (best seen in the calf, Fig. 1c and d) arises at the apex of the melon, passes about 6 cm over the eye, dips ventrad to a low point about halfway between flipper base and dorsal fin, and then sweeps dorsad to an area between



Fig. 2 Dorsal, ventral and lateral views of cranium of PBB71/4 (SAM 36323).

Table 1 Skeletal Measurements and Meristics of Four Specimens of *Lagenodelphis hosei* Fraser, 1956, including the Holotype

Measurement or count	Sarawak specimen (holotype, BMNH1895.5.9.1)* physically mature (from Fraser, 1956)	South African female PBB71/3 (SAM ‡ 36322), physically mature	South African male PBB71/4 (SAM ‡ 36323), physically mature	Eastern Pacific calf LR23 (USNM † 396079)
Condylobasal length	413 mm (100%)	429	440	
Length of rostrum	226 (54.7)	240 (55.9)	241 (54.8)	
Width of rostrum at base	121 (28.3)	119 (27.7)	130 (29.5)	
	(53.5% of rostr. ln.)	(49.6% of rostr. ln.)	(53.9% of rostr. ln.)	
Width of rostrum at midlength	71 (17.2)	71 (16.6)	80 (18.2)	
Width of rostrum 60 mm anterior to antorbital notches	85 (20.5)	86 (20.0)	101 (23.0)	
Least supraorbital width	202 (48.8)	202 (47.1)	218 (49.5)	
Preorbital width	207 (50.1)	207 (48.3)	223 (50.7)	
Postorbital width	230 (55.7)	229 (53.4)	247 (56.1)	
Zygomatic width	225 (54.5)	225 (52.4)	240 (54.5)	
Parietal width	170 (41.2)	161 (37.5)	177 (40.2)	
Maximum width of premaxillae	82 (19.9)	78 (18.2)	83 (18.9)	
Length of upper left tooth row	194 (46.9)	193 (45.0)	213 (48.4)	
Length of lower left tooth row	193 (46.7)	198 (46.2)	207 (47.0)	
Length of left ramus	350 (84.7)	367 (85.5)	375 (85.2)	
Coronoid height of left ramus	70 (16.9)	65 (15.2)	71 (16.1)	
Length of symphysis	36 (8.7)	37 (8.6)	31 (7.0)	
Number of teeth	43 44 ca. 40 42	40 42 39 39	42 42 41 40	42 42 42 44
Total number of vertebrae	80 ± 2	78	78 ± 1	79
Vertebral formula	C7T15L21©37 ± 2	C7T16L21C34	C7T16L + C55 ± 1¶	C7T16L + C56§

* British Museum (Natural History), London.

† US National Museum, Washington, DC.

‡ South African Museum, Cape Town, SA.

§ Counts from radiographs of carcass.

¶ Vertical column disarticulated during preparation; 1-3 small terminal vertebrae missing.

Percentage of condylobasal length in parentheses.

dorsal fin and flukes, where it fragments into a series of diagonal lighter brushings that impart to the posterior half of the animal a chevron pattern when seen from above. The distinctive lateral stripe (eye-to-anus stripe in terminology of Mitchell³) is subsidiary and subparallel to the cape. It also arises at the apex and closely parallels the cape margin for about half the length of the body, diverging ventrad behind the dorsal fin and becoming diffuse above and behind the genital region.

The stripe varies markedly among the specimens in width, clearly defined length, and intensity of pigmentation, in apparent correlation with age. In the calf (Fig. 1c) and the subadult female (Fig. 1h) it is relatively narrow, passing above the eye, and becomes obscure before reaching the genital region. In the larger male from the eastern Pacific (Fig. 1a) (of unknown degree of maturity), the stripe is broader, encompassing the dorsal half of the eye, and is well defined for its entire length to where it interacts with the dorsal overlay system (discussed below) in the genital region. La Grange noted "considerable variation" in the intensity and definition of the stripe among the animals captured with this specimen, some having broader and darker stripes. Observations of animals at sea off the Natal Coast of South Africa indicated that pigmentation of this area was related to size of the animal. In the adult male and female from South Africa (Fig. 1e-g) both larger than the eastern Pacific male, the stripe is still broader, encompassing the eye completely. It appears to be broader than it actually is, however, as its ventral margin can be discerned upon close examination but is obscured by heavy pigmentation of the ventral portion of the dorsal field overlay. In the smaller specimens these two elements are distinct one from the other.

The dorsal field overlay encompasses the flipper stripe and overlaps completely the cape and eye-to-anus stripe. This feature also shows graded development correlated with size, being more lightly pigmented in the smaller specimens. There is a narrow but well-defined light line of demarcation between the anterior end of the flipper stripe and the lip patch. The flipper stripe has a double structure, which is the more clearly defined in the younger animals. The dorsal field in all the specimens has one or two thin posteriorly directed extensions that diverge from the ventral margin and run parallel for several centimetres before disappearing or rejoining the field.

In the genital region of the large eastern Pacific male (Fig. 1a), some interaction can be seen between the eye-to-anus stripe and the structure of the dorsal field overlay. Similar interactions between colour pattern elements may be observed in species of *Lagenorhynchus*³. In the South African adults the interaction is obscured by heavier pigmentation of the dorsal field in this region. Although indications strongly suggest that this and the other trends discussed above are related to development, an alternative explanation of geographical variation cannot be eliminated until known adult specimens from the eastern Pacific and other areas are compared to the South African adults.

Not seen in any of the specimens so far collected, but observed in animals at sea off the Natal coast of South Africa, is a spinal blaze (terminology of Mitchell³) extending from the light-coloured part of the side in a curve up towards the insertion of the dorsal fin.

Similarities in coloration of *Lagenodelphis* to any of the *Lagenorhynchus* species are difficult to demonstrate; there is no tendency towards development of a flank blaze so char-

Table 2 External Measurements of Six Specimens of *Lagenodelphis hosei* Fraser, 1956

Measurement or count	Eastern Pacific specimens		South African specimens			Australian specimen
	LR22, male, unknown degree of maturity	LR23 (USNM* 396079), male calf, 19.3 kg	PBB71/3 (SAM† 36322), adult female, 164 kg	PBB71/4 (SAM† 36323), adult male, 209 kg	PBB72/2 (PEM‡ 1517/93), subadult female, 130 kg§	—, adult female
Total length	226 cm (100%)	110.2	236	264	225.9	226
Tip of upper jaw to centre of eye	—	17.7 (16.1)	33 (14.0)	33 (12.5)	33.1 (14.7)	29.5 (13.1)
Tip of upper jaw to apex of melon	4.5 (2.0)	1.8 (1.6)	4.5 (1.9)	3 (1.1)	4.8 (2.1)	3.5 (1.5)
Length of gape	—	14.3 (13.0)	27.5 (11.7)	27 (10.2)	28.0 (12.4)	24 (10.6)
Tip of upper jaw to external auditory meatus	—	21.1 (19.1)	—	39 (14.8)	38.2 (16.9)	34.5 (15.3)
Centre of eye to angle of gape	—	4.0 (3.6)	5.5 (2.3)	6 (2.3)	6.0 (2.7)	4.4 (1.9)
Centre of eye to centre of blowhole	—	11.0 (10.0)	21 (8.9)	23 (8.7)	19.7 (8.7)	17.6 (7.8)
Tip of upper jaw to blowhole	—	16.5 (15.0)	33.5 (14.2)	28 (10.6)	30.9 (13.7)	28.6 (12.7)
Tip of upper jaw to anterior insertion of flipper	—	24.5 (22.2)	46 (19.5)	43 (16.3)	45.8 (20.3)	42.0 (18.6)
Tip of upper jaw to tip of dorsal fin	—	61.0 (55.4)	133 (56.4)	132 (50.0)	118.4 (52.4)	—
Tip of upper jaw to umbilicus	—	51.5 (46.7)	110 (46.6)	116 (43.9)	106.9 (47.3)	—
Tip of upper jaw to centre of genital aperture	—	71.3 (64.7)	165 (69.9)	170 (64.4)	157.2 (69.6)	—
Tip of upper jaw to centre of anus	—	78.8 (71.5)	175 (74.2)	189 (71.6)	187.7 (83.0)	—
Projection of lower jaw beyond upper	—	0	0.3	1	0.6	0.4
Girth at axilla	—	61.7 (56.0)	110 (46.6)	—	106.9 (47.3)	—
Maximum girth	—	—	132 (55.9)	—	116.5 (51.6)	—
Girth at anus	—	37.9 (34.4)	70 (29.7)	92 (34.8)	70.0 (31.0)	—
Width of blowhole	—	2.0	2.5	4	2.5	2.4
Length of flipper, to anterior insertion	25.1¶ (11.1)	15.2 (13.8)	27 (11.4)	28.8 (10.9)	26.7 (11.8)	25.5¶ (11.3)
Length of flipper, to axilla	18.8¶ (8.3)	10.5 (9.3)	19.5 (8.3)	21.5 (8.1)	20.0 (8.9)	17.3¶ (7.7)
Width of flipper	6.6¶ (2.9)	4.8 (4.4)	8 (3.4)	9.4 (3.6)	8.3 (3.7)	8.1¶ (3.6)
Height of dorsal fin	17.8¶ (7.9)	7.6 (6.9)	17 (7.2)	22 (8.3)	15.9 (7.0)	15.0¶ (6.6)
Span of flukes, tip to tip	49.5¶ (21.9)	22.8 (20.7)	57 (24.1)	59 (22.3)	50.9 (22.5)	47.0¶ (20.8)
Width of fluke, from notch to nearest point on anterior border	—	7.7 (7.0)	13 (5.5)	14.2 (5.4)	13.4 (5.9)	12.6¶ (5.6)

Percentage of total length in parentheses. Measurements taken as specified by Committee on Marine Mammals, American Society of Mammalogists⁶.

* US National Museum, Washington, DC.

† South African Museum, Cape Town, SA.

‡ Port Elizabeth Museum, Port Elizabeth, SA.

§ Measurements converted from inches and eighths to centimetres and tenths.

¶ Measured 10 h after death; some dehydration probable.

|| Measured after exposure to Sun; some dehydration probable.

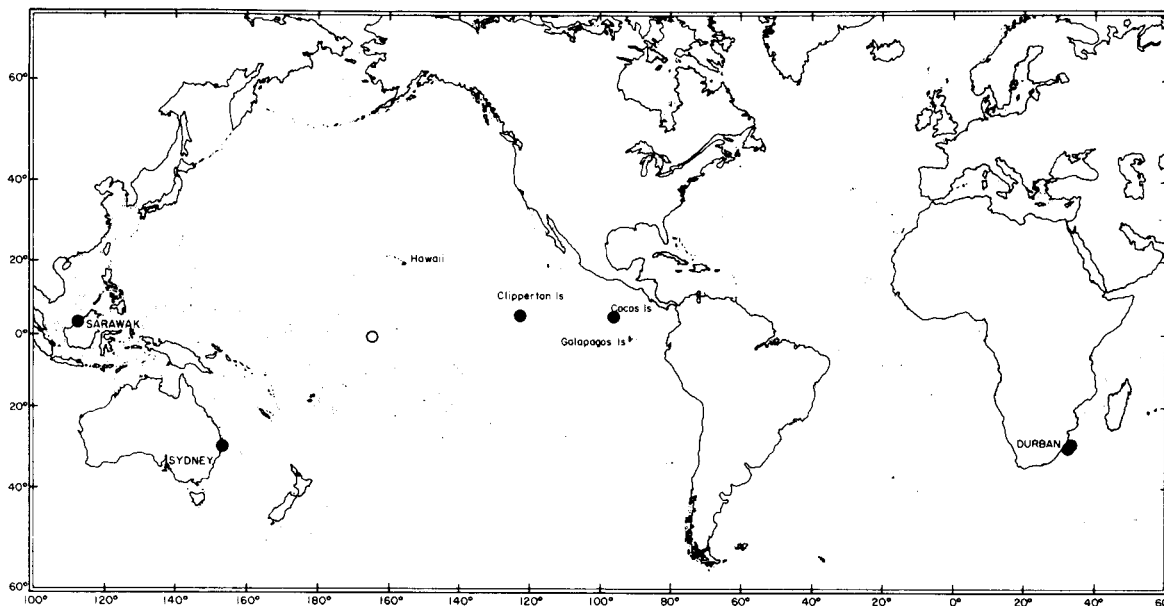


Fig. 3 Recorded occurrences of *Lagenodelphis hosei*. White circle represents sighting record.

acteristic of that genus³, aside from the above-discussed propensity to posterior interaction of the eye-to-anus stripe and dorsal field. The species seems much closer to the *Stenella-Delphinus* group. The overall colour pattern of the adult *Lagenodelphis* is very similar to that of *Stenella coeruleoalba* with the exception of the flipper stripe, which in *S. coeruleoalba* runs to the eye or angle of gape⁵, and the lack of a subtending line below the eye-to-anus stripe in *Lagenodelphis*. A comparison of the young *Lagenodelphis* with *Delphinus* reveals several features in common to both, especially if the longer beak of the latter is taken into consideration. The arrangement of the flipper stripe and eye-to-anus stripe is very similar in both species. The longer mandible of *Delphinus* seems to affect the relative position of these features, so that the flipper stripe extends farther forward in *Delphinus*, and the eye-to-anus stripe is correspondingly farther forward in the head region than in *Lagenodelphis*. *Delphinus* differs markedly, of course, in the development of a large, brightly-coloured thoracic patch (terminology of Mitchell³) which results from the unique partial overlap of cape and dorsal field and which is completely absent in *Lagenodelphis*.

The widely separated localities of collection reported here (Fig. 3) and the close similarity of the specimens to each other



Fig. 4 Photo of dolphin sighted by Balcomb northeast of Phoenix Islands.

suggest that the species may be continuously distributed in high-seas tropical waters of the Pacific and Indian Oceans. It has also probably been sighted in the Central Pacific. On August 11, 1966, Balcomb observed a school of approximately four hundred dolphins at 165° W longitude on the equator (northeast of the Phoenix Islands). A field sketch and photographs (Fig. 4) clearly show the short, well-defined snout, small subfalcate dorsal fin, small flippers, chunky build, and distinct lateral dark stripe of *L. hosei*.

We thank John La Grange for collecting the eastern Pacific calf and bringing it to our attention, Captains J. Luz of the seiner Larry Roe and J. Adams of the Concho for their assistance, and James G. Mead for preparing the skull of the specimen and providing radiographs of the carcass of the calf. Captain T. Haakestadt and the crew of the whale-catcher C. G. Hovelmeier gave much valuable help in the collection of the South African specimens. We also thank David H. Brown for bringing the Coffs Harbour specimen to our attention. William E. Schevill very kindly allowed us to include the 1972 eastern Pacific record. Edward D. Mitchell provided excellent photographs of the holotype. Kenneth S. Norris, Carl L. Hubbs, and Dale W. Rice read the manuscript.

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