STRANDING OF A SPECIMEN OF GRAY'S BEAKED WHALE AT PUERTO PIRAMIDES (CHUBUT, ARGENTINA) AND ITS GONADAL APPRAISAL

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ABSTRACT

A single specimen of *Mesoplodon grayi* was stranded at Puerto Pirámides (42°35'S, 64°53'W), on the Patagonian coast (Chubut, Argentina). Some external body measurements were taken in situ and the skull was preserved. A list of skull measurements is given. Histological study of the testes showed the specimen to be sexually mature. Noteworthy was the presence of adipocytes in the interstitial tissue, which can be easily confused with Leydig's cells. Age could not be determined since the lower jaws were missing and the teeth could not be recovered.

INTRODUCTION

Previous records of Gray's whale have been summarized by Goodall (1978), Lichter and Hooper (1983) and Lichter (in press), for the Argentine coast, including two specimens near the site of the present stranding of Península Valdés (True, 1910; Mermóz, 1979) (Fig. 1).

Other species of Ziphiidae have also been found in this area, such as a Tasman whale (*Tasmacetus shepherdi*) reported by Mead and Payne (1975).

The present paper presents external and skull measurements and a histological study of the testes.

MATERIAL AND METHODS

Features of the stranding

We were informed of the stranding by the Gamekeeper of the Sealion Reserve at Punta Pirámides, Chubut, Argentina. A medium-sized cetacean, which was later determined as a Gray's beaked whale *Mesoplodon grayi*,

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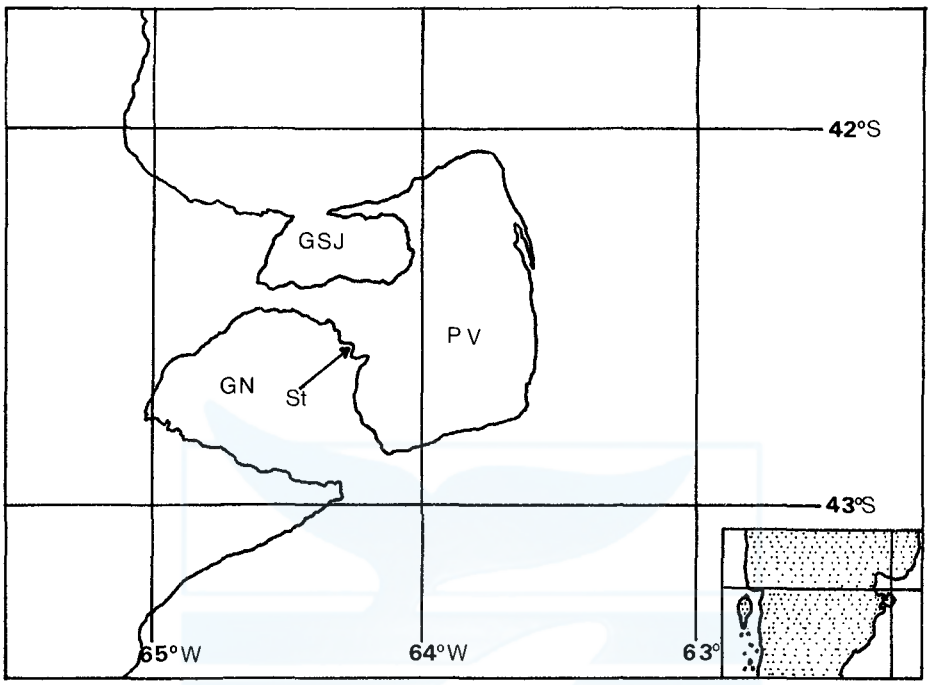


Fig. 1. Location of the stranding. PV: Península Valdés, GN: Golfo Nuevo, GSJ: Golfo San José, St: Stranding.

stranded on June 28, 1983. It was in good condition, except that the body had ulcerations made by sea-birds (gulls and petrels), there were wounds and scars of unknown origin in the skin, the beak was broken, and the lower jaws had been sectioned, possibly by fishermen.

Identification of the species

The species was identified in the field as *Mesoplodon grayi*, by means of the color pattern, presence of seven maxillary teeth and descriptions given by Ross (1979) and Lichter and Hooper (1983) "body elongate, compressed laterally to some degree, bulgy melon, long and slender beak, small dorsal fin inserted at about two-thirds of body length from the anterior, small flippers and flukes lacking of caudal notch". Subsequently study of the skull confirmed the species determination. The cranial rostrum is "slender, elongate, narrow at its base, with a straight dorsal margin in profile view, without prominential notches in dorsal view" (Ross, 1979).

Biological data and samples

Standard external measurements (Norris, 1961) were taken to the nearest

TABLE 1. EXTERNAL BODY MEASUREMENTS OF THE PRESENT SPECIMEN (MEASURED AFTER NORRIS, 1961)

Measurements	cm
1. Total length, from tip of upper jaw to middle of the posterior margin of tail flukes	452.5
2. Tip of upper jaw to anterior insertion of flipper	120
3. Tip of upper jaw to anterior insertion of dorsal fin	340
4. Tip of upper jaw to midpoint of genital aperture	300
5. Tip of upper jaw to centre of anus	343
6. Tip of upper jaw to centre of blowhole	60
7. Tip of upper jaw to angle of gape	37.5
8. Tip of upper jaw to centre of eye	63.5
9. Girth on a transverse plane intersecting axilla	186
10. Girth, maximum	206
11. Girth on a transverse plane intersecting anus	148
12. Length of the flipper, anterior insertion to tip	55
13. Length of the flipper, axilla to tip	46
14. Maximum width of flipper	18
15. Length of dorsal fin base	31
16. Height of dorsal fin	19
17. Width of flukes tip to tip	117
18. Distance from nearest point on anterior border of flukes to notch	35

5 mm with a tape measure and are listed in Table 1. Skull measurements were taken with a caliper and a metal ruler to the nearest 1 mm, following the methods of Ross (1979) (Table 2). Color pattern was recorded in the field and vertebral count was made directly on the cleaned skeleton.

The gonads were fixed in 10% formalin, embedded in paraffin, cut into 7 μm thick sections and stained with Hematoxylin-Eosine, Masson's Trichrome and Periodic Acid Schiff-Hematoxylin. Frozen pieces were cut in a criostate and stained with Sudan for lipid detection. Sub-capsular, perimediastinic, and intermediate zones of the entire glands were studied in this evaluation.

RESULTS

The specimen was a 452 cm adult male. Other external body measurements are listed in Table 1.

The dorsal surface of the body was black, gradually becoming grayish laterally. The ventral surface was black with unpigmented patches (5 to 30 mm in diameter). The dorsal fin, flippers and flukes were black. As is usual in the Ziphiidae, the specimen had two ventral throat grooves.

Four different positions of the skull can be seen in Fig. 2. Seven small maxillary teeth were observed in the stranded specimen, but these were lost during the cleaning of the skull.

The vertebral formula was C7, T10, L11, C18+ = 46+.

TABLE 2. SKULL MEASUREMENTS OF THE PRESENT SPECIMEN IN MILLIMETER (MEASURED AFTER ROSS, 1979)

Measurements	mm
1. Condylobasal length	810
2. Length of rostrum, tip of beak to line connecting apices of antorbital notches	535
3. Tip of rostrum to most anterior extension of pterigoid	465
4. Tip of rostrum to most posterior extension of maxillaries between pterygoids	510
5. Tip of rostrum to most posterior extension of maxillary plate	720
6. Tip of rostrum to anterior margin of superior nares	595
7. Tip of rostrum to most anterior point on premaxillary crest	620
8. Tip of rostrum to most posterior extension of temporal fossa	760
9. Tip of rostrum to most posterior extension of lateral tip of premaxillary crest	650
10. Tip of rostrum to most anterior extension of pterygoid sinus	500
11. Length of temporal fossa	90
12. Length of orbit	90
13. Length of right nasal on vertex of skull	55
14. Length of nasal suture	35
15. Breadth of skull across postorbital process of frontals	298
16. Breadth of skull across zygomatic processes of squamosales	288
17. Breadth of skull across centers of orbits	285
18. Least breadth of skull across posterior margins of temporal fossae	190
19. Greatest span of occipital condyles	109
20. Greatest width of an occipital condyle (right)	45
21. Greatest length of an occipital condyle (right)	68
22. Greatest breadth of foramen magnum	50
23. Breadth of skull across exoccipitals	235
24. Breadth of nasals on vertex	31
25. Least distance between premaxillary crests	17
26. Greatest span of premaxillary crests	127
27. Least width (strictly transverse) of premaxillae where they narrow opposite superior rares	100
28. Greatest width of premaxillae anterior to place of measurement No. 27	111
29. Width of premaxillae at midlength of rostrum	31
30. Width of rostrum in apices of antorbital notches	180
31. Width of rostrum in apices of prominential notches	97
32. Greatest width of rostrum at midlength of rostrum	45
33. Greatest depth of rostrum at midlength of forstrum	46
34. Greatest transverse width of superior nares	48
35. Greatest width of temporal Fossa approximately at right angles to greatest length (right)	65
36. Least distance between (anterior) maxillary foramina	65
37. Least distance between premaxillary foramina	34
38. Distance from posterior margin of left maxillary foramen to most anterior extension of left maxillary prominence	35
39. Length of tympanic bulla, left	48
40. Length of tympanic bulla, right	53
41. Height of mandible at coronoid process	115

Histological study of the testes and related organs

Before fixing, testes weight and measurements were taken as follows:

	left	right
weight (g)	86.5	112
measurements (mm)	90×45×50	120×50×50

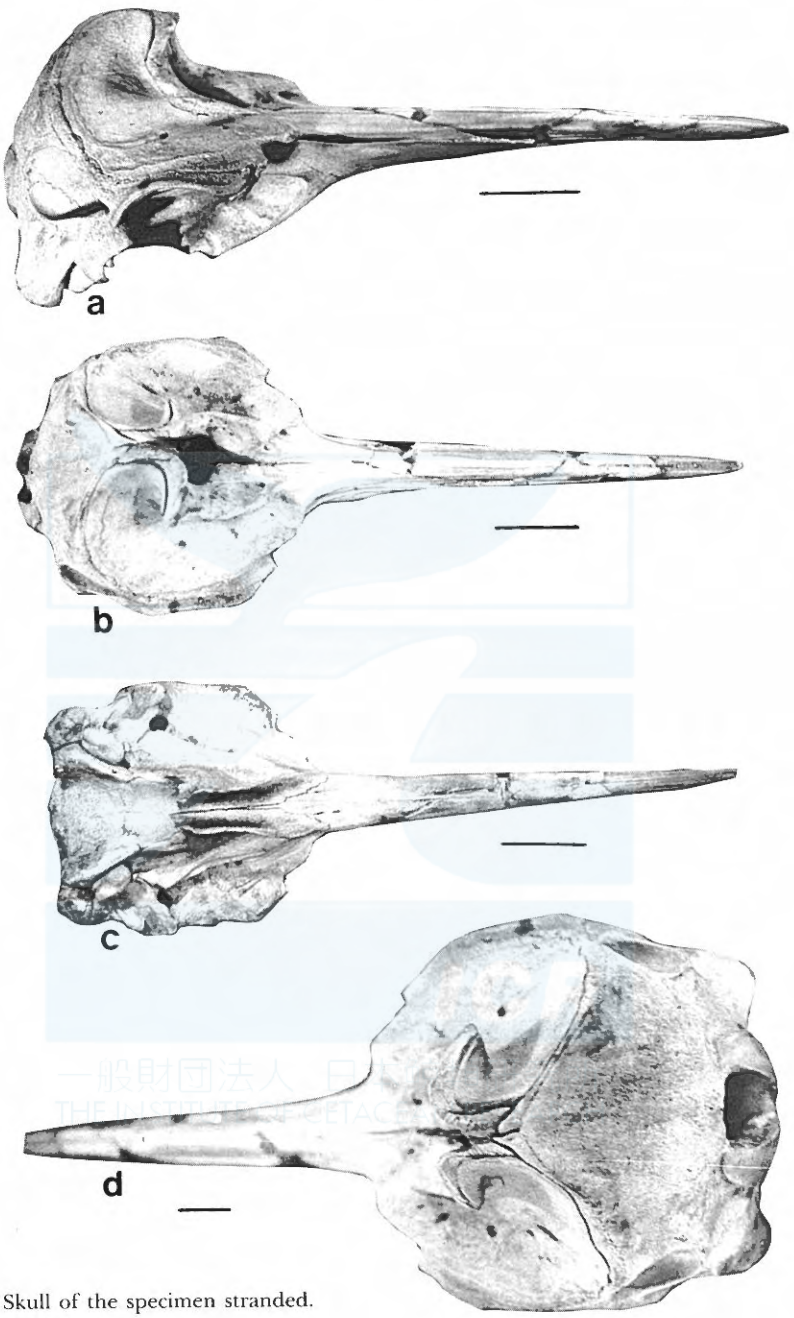
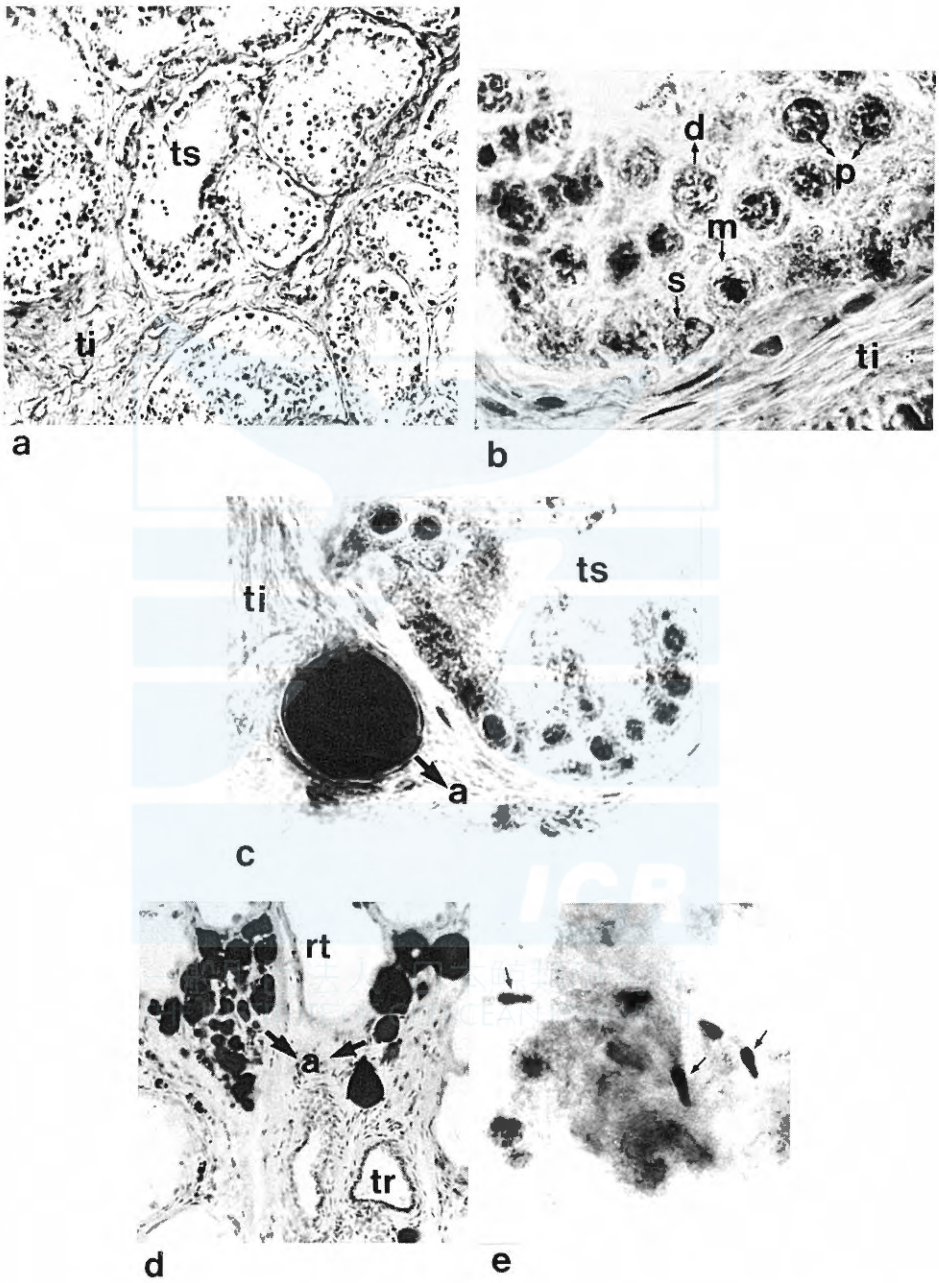


Fig. 2. Skull of the specimen stranded.
a. Lateral view
b. Dorsal view
c. Ventral view
d. Posterior view
Scale indicates 10 cm.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Seminiferous tubules: All zones observed possesed typical functional mature tubules (Fig. 3a) with an average diameter of 195.31 μm (S.D. $\pm$ 22.5). Despite postmortem changes it was possible to distinguish the different stages of the spermatogenic cycle. Qualitative and quantitative analyses of the seminal epithelium showed spermatogonial mitotic divisions (Fig. 3b), as well as complete spermatocytogenesis and spermiogenesis. All of the tubules counted (300 tubules $\times$ three zones) showed spermatogenic activity.

The tubuli recti and rete testis structure of the intratesticular seminal pathways, confirmed the sexual maturity of this individual. Both the tubules and the rete had terminal states of differentiation at epithelial and stromatal levels but no spermatozoa were observed in the lumen.

The interstitial space of *Mesoplodon* testes follows the general delphinid pattern of organization (Harrison, 1969). Interstitial cells are relatively unconspicuous, hard to distinguish in routine preparations and occur isolated in an abundant regular connective tissue stroma. Large and small blood vessels are distributed randomly in the stroma, but no apparent relation exists between these vessels and the interstitial cells. The lymphatic vessels could not be seen because we could not perform the intravascular perfusion of the gland (Harrison, 1969; Fawcet, Neaves and Flores, 1973; Sergeant, 1962).

An interesting feature of the interstitial space is the presence of adipocytes. These appear isolated in the interstitium or form masses of closely compacted cells (Figs 3c and 3d). Adipocytes with few intracytoplasmic lipid droplets can be easily confused with interstitial cells. In mammalian testis literature, no reports concerning these cells (in physiological or pathological conditions) appeared (Courot, Hochereau and Ortavant, 1970; Setchell, 1978). Such adipocytes in a normal functional gland are remarkable; further observations are needed to confirm the *Mesoplodon* interstitium histology (Roosen-Runge, 1962, 1969).

Fig. 3. Histology of the testes of the present specimen.
a. Subcapsular zone. Seminiferous tubule (ts) and intertubular space (ti). (Masson's Trichromic Staining, original magnification 100 $\times$).
b. Subcapsular zone. Seminiferous tubule epithelium. s: Sertoli cell nuclei, m: gonial mitosis, p: pachitene primary spermatocytes, d: diplotene primary spermatocytes, ti: interstitial tissue showing abundant fibrilar material. (Pas-Hematoxylin Staining, 630 original magnification 630 $\times$).
c. Subcapsular zone. Intertubular space (ti) showing and isolated adipose cell (a) resting on the lamina propia of the seminiferous tubule (ts). (Sudan-Hematoxylin Staining, original magnification 400 $\times$).
d. Mediastinum testes showing adipocytes clusters (a) between the tubuli recti (tr) and rete channels (rt). (Sudan-Hematoxylin Staining, original magnification 100 $\times$).
e. Spermatozoa in the epididymal duct. See the lateral view of the heads (arrows) with the typical flat anterior segment. (Hematoxylin-Eosin Staining, original magnification 100 $\times$).

Epididymis and ductus deferens: These extragonadal tubular structures are lined by a single or pseudostratified columnar epithelium. Despite the intense desquamation, it was possible to find a great number of spermatozoa. The flat anterior segment of the sperm head observed in other cetaceans was evident in profile views (Fig. 3e).

DISCUSSION

Mesoplodon grayi has a circumpolar distribution in the southern hemisphere between 30°S and 45°S (Ross, 1979). More southern records of this species are listed for Tierra del Fuego (54°S), including one nearly complete skeleton, three crania and one group of thoracic vertebrae (Goodall, 1978). Few strandings along the Argentine coast have been reported in several papers, and reviewed by Lichter and Hooper (1983).

The present paper include measurement data and original considerations about the sexual maturity.

There is little information on lengths of specimens of this species. Ross (1979) gave total lengths of four adult males as follows: 1) 4.72 m, 2) 4.27 m, 3) 5.64 m, 4) 4.53 m ($\bar{x}$ = 4.79 m, s.d. −1 = 0.59). The specimen from Puerto Pirámides measured 4.52 m, falling within this range. The condylobasal length of Ross's specimen No. 1 was 802 mm, and expressed as percentages of body length was 16.99%. The present specimen's CBL was 810 mm, being the 17.92% of the body length.

The vertebral formula of the present individual agrees with that of six specimens discussed by Ross (1979), but individual variation can be seen in the number of thoracic vertebrae (range from 9 to 11), lumbar vertebrae (range from 10 to 12), caudal vertebrae (range from 16 to 20), and the total number of vertebrae (range from 46+ to 49).

Unfortunately, age determination could not be performed because the lower jaws had been cut off and the teeth were lacking, but the histological appraisement of the specimen testes, epididymis, and ductus deferens, enable us to determinate that the animal was sexually mature and in an active state of spermatogenesis.

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