FERESA ATTENUATA CAPTURED AT THE PACIFIC COAST OF JAPAN IN 1963

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INTRODUCTION

The fishermen at some fishing villeges of the Izu Peninsula, Shizuoka Prefecture, engage in fishing for small cetaceans. Their method of fishing is a unique one. When some small fishing vessels find a school of dolphins, cooperating with other ships, they drive it toward the inlet near the villege. The school is driven in and enclosed in the inlet with a net. Then usually they are pulled up and killed.

On January 28, 1963 a school of *Feresa attenuata* composed of 14 porpoises were discovered near the entrance of Sagami Bay and captured at Futo, on the east coast of the Izu Peninsula. All of them were kept alive for some days in a pool of the Ito Aquarium together with other dolphins. Though during this period effort to tame them was made, all of them died within 22 days after the capture, and they were examined.

Feresa Gray is one of the genera about which very little is known. The first specimen was reported in 1827 as *Delphinus intermedius* by Gray but the location of the collection is not known. Gray also reported a second specimen, a type of *Feresa attenuata*, in 1875, the collection location of which is known only as " the South Sea ". These specimens are known only from the skulls, and other skeletal and external characters remained unknown until recently. Then Yamada (1954) reported a whole skeleton and some fragments of the blubber collected at Taiji, Japan. This specimen gave us the first knowledge on the whole skeleton and a glimpse of external characteristics. The fourth specimen was captured in 1958 at Yenn, Senegal and a report on its skull was made by Cadenat (1958).

So we think it valuable to report the data on this poorly known genera obtained from the examination of the Futo specimens.

CAPTURE AND KEEPING

On January 28, 1963 a school of *Feresa* Gray composed of 14 porpoises was found by a fishing vessel at a point about 2 km off the north shore of Oshima Is. which is situated at the entrance of Sagami Bay. Their direction of swimming was southerly. Near the area where the school was found, no school of the same species had previously been observed.

After about two and a half hours they were driven by a number of fishing vessels into the Futo harbour, which is situated about 30 km north west from O-

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shima Is. It required about twice the amount of time as compared with other small cetaceans, for example *Stenella caeruleoalba*, to make the drive. During the driving they seemed obedient and sounded shallowly only three times, each of which was for about 3 minutes. Other small cetaceans usually sound deeply many times in order to escape.

In the enclosure of the harbour, they acted in the same manner as in the pool of the Ito Aquarium, some kept themselves perpendicular and others swam slowly in the horizontal postur around the former. They observed the men on the shore with both eyes when they were perpendicular.

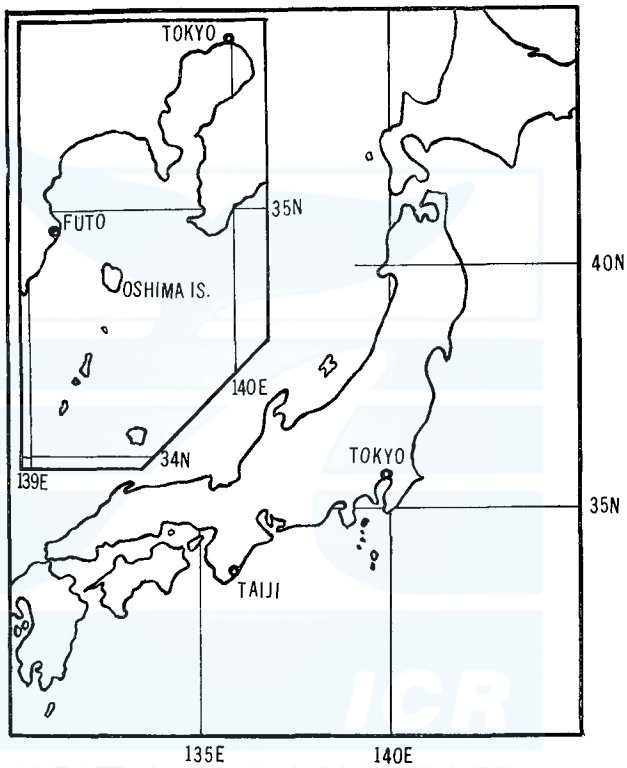

Fig. 1. Chart showing the coastal area of Japan.

The porpoises were separated into five groups and transported from the harbour to the Ito Aquarium by truck during the next two days following capture. About a half hour was spent for each transportation, and the condition of the whales seemed fairly well with no vomiting except for one which died in transit during the fourth trip. During the transportation the respiration rate and the pulse rate of all porpoises was counted every five minutes. The average respiration rate fell between 8.4 and 5.1 times per minute, and it showed the tendency to decrease with the elapse of time on the truck. The total average rate of respiration during the transport was 7.1 times per minute. The average pulse rate was 66 times per minute. The

body temperature was not observed. The average air and water temperature at the time of the transportation were 8.2°C and 13.5°C respectively.

Except for one male which began to take food all Porpoises died within a week from capture. Of the 12 whales which died in the pool within the week, five could not be observed the condition when dying but the other seven had convulsive fits and sank with their mouths half open after abnormal swimming for 20 minutes to 3 hours. The cause of the death could not be determined.

The one male which lived in the aquarium for 22 days, seems to have died from pneumonia judging from the swelling of limphonodi bronchopulmonales and purulence in the lungs.

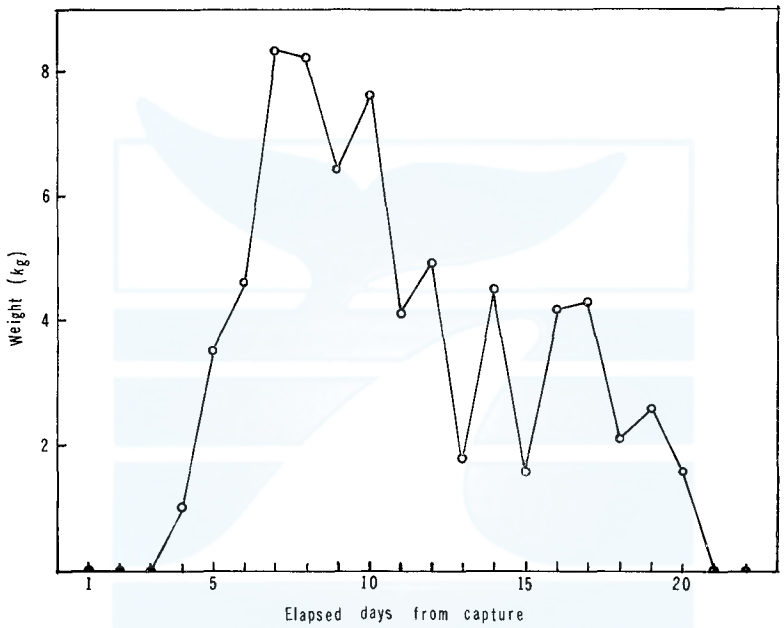

Fig. 2. Food consumption of a male *Feresa* Gray kept alive for 22 days in a pool.

This male first begun to take living sardines 4 days after capture, having rejected squid, saurel and mackerel-pike. From this success we gave food by throwing, mainly in daytime, aiming the standard weight 8 kg of food a day, or five per cent of the presumed body weight of 160 kg. But the standard was attained only for 2 days. Though the animal kept high activity at night, the throwing of food at night did not increase consumption.

Seven days after capture, giving food from hand directly was tried and succeeded easily, but it was stopped on the ninth day due to the decrease of food intake. The food consumption of the specimen is shown in Fig. 4.

The respiration rate in the aquarium is shown in Fig. 3. Each one is the mean number of the per minute rates counted over a five minute period at 10: 00 and 14: 00. The average rate of respiration of the male porpoise in the aquarium

is 3.9 times per minute and average time spent submerged in the water is 25.6 seconds.

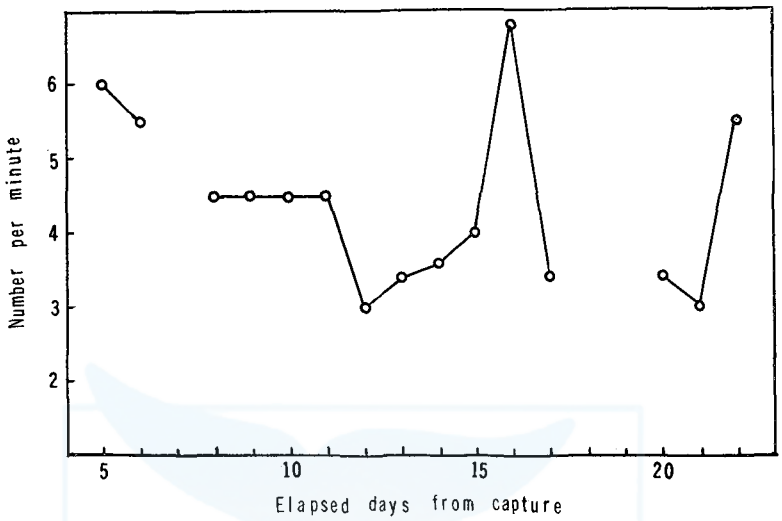

Fig. 3. Respiration rate of the same whale shown in Fig. 2.

TABLE 1. DATES TRANSPORTED AND DEATH OF FUTO SPECIMENS

Specimen No.	Date transported	Date of death	Days kept alive	Sex	Body length (cm)
1	29 I '63	30 I '63	2	M	240
2	30 I '63	30 I '63	2	M	217
3	30 I '63	31 I '63	3	M	215
4	30 I '63	31 I '63	3	F	215
5	29 I '63	1 II '63	4	F	225
6	29 I '63	2 II '63	5	F	225
7	29 I '63	2 II '63	5	F	221
8	29 I '63	2 II '63	5	M	229
9	29 I '63	3 II '63	6	M	223
10	30 I '63	3 II '63	6	M	244
11	29 I '63	4 II '63	7	F	227
12	29 I '63	4 II '63	7	F	221
13	30 I '63	4 II '63	7	F	208
14	29 I '63	19 II '63	22	M	214

Note: No. 4 is still frozen at Enoshima Marineland.
Skeleton of No. 6 is kept at the Zool. Museum, Herbart University by the wishes of Dr. W. E. Schevill.
No. 10 is used to show the internal organs at Ito Aquarium.

EXTERNAL CHARACTERS

The external measurements of the Futo specimens are shown in Table 2 and Appendix I. The ranges of body length in 7 males and 7 females are 214–244 cm and

208–227 cm respectively, and some of both sexes were full grown, which shows that the male grows larger than the female. All of the measurements of tail flukes, flippers dorsal fin and head region made on Taiji specimen by Yamada (1954) fall within the range of the Futo specimens.

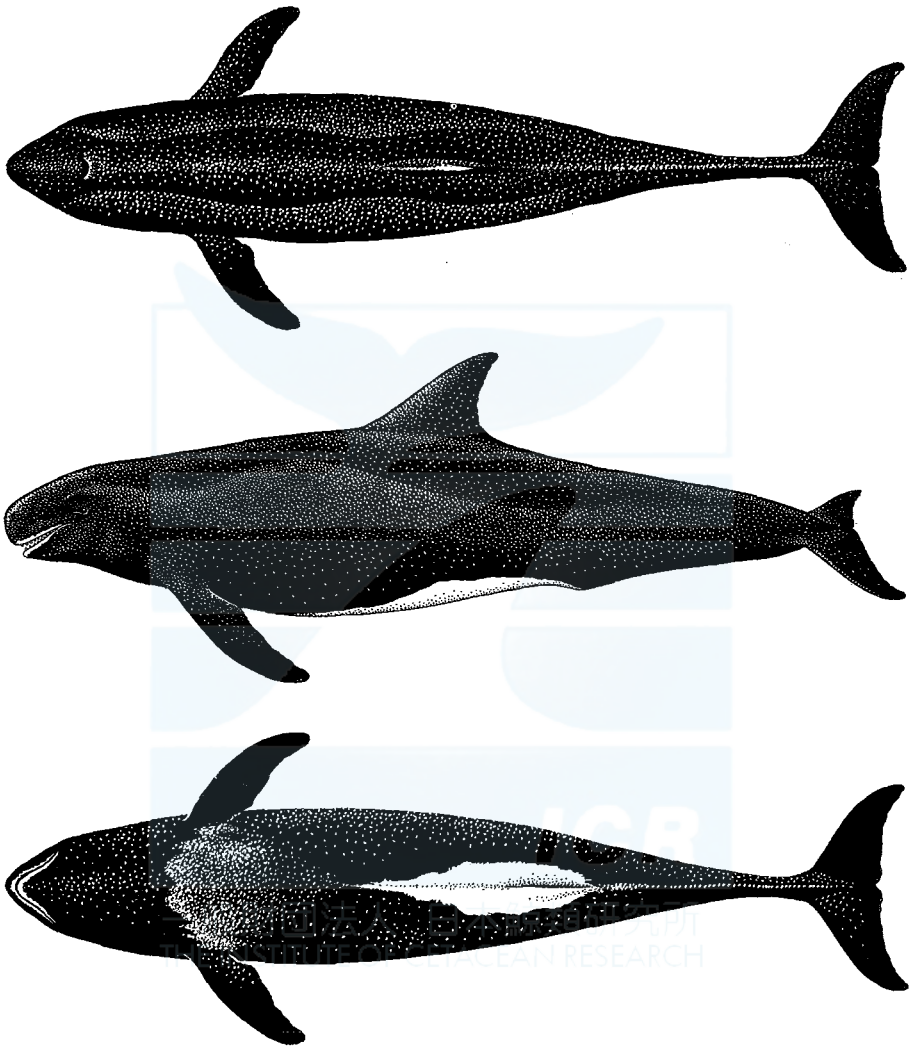

Fig. 4. Dorsal, lateral and ventral views of *Feresa attenuata*.

The sexual difference of the external measurements is found in the length between the tip of upper jaw and middle of reproductive aperture, this measurement is larger in the female than in the male.

TABLE 2. EXTERNAL MEASURMENT OF FUTO SPECIMENS SHOWN IN THE PERCENTAGE OF TOTAL LENGTH

		Range in 7 males	Range in 7 females
1.	Length, total	214 – 244 cm	208 – 227 cm
2.	Length, tip of upper jaw to center of eye	8.7 – 11.4 %	8.1 – 10.8 %
3.	Length of gape	5.4 – 7.2	6.0 – 8.4
4.	Center of eye to external auditory meatus (direct)	3.0 – 4.0	3.2 – 3.8
5.	Length, center of eye to angle of gape	2.4 – 5.8	1.4 – 3.8
6.	Length, tip of upper jaw to blowhole	6.7 – 11.9	7.2 – 11.1
7.	Anteriormost point of gape to blowhole along the melon	15.2 – 18.1	16.3 – 17.1
8.	Length, tip of upper jaw to anterior insertion of flipper	16.8 – 21.6	18.6 – 21.3
9.	Length, anterior insertion of flipper to axilla	6.1 – 6.7	4.0 – 7.0
10.	Length, tip of upper jaw to tip of dorsal fin	54.8 – 61.8	54.3 – 60.6
11.	Length, tip of upper jaw to midpoint of umbilicus	38.6 – 45.1	40.3 – 44.9
12.	Length, tip of upper jaw to midpoint of genital aperture	56.2 – 51.3	57.8 – 61.1
13.	Length, tip of upper jaw to center of anus	62.8 – 66.8	61.4 – 65.8
14.	Projection of upper jaw beyond the lower	0.9 – 2.5	0.9 – 1.9
15.	Girth, at anterior insertion of flipper	45.5 – 49.6	45.6 – 53.8
16.	Girth, at anterior insertion of dorsal fin (maximum)	52.6 – 64.7	59.0 – 63.3
17.	Maximum height of body, including dorsal fin	25.2 – 31.7	27.2 – 32.4
18.	Length of eye	1.0 – 1.4	0.9 – 1.3
19.	Width of blowhole	1.4 – 2.1	1.3 – 2.3
20.	Length of flipper, anterior insertion to tip	18.3 – 22.1	14.7 – 22.2
21.	Length of flipper, along anterior edge	20.3 – 24.0	20.5 – 24.4
22.	Length of flipper, axilla to tip	13.8 – 16.4	14.7 – 19.0
23.	Width of flipper, maximum	6.1 – 7.0	5.8 – 7.0
24.	Dorsal fin, height	9.4 – 11.6	9.6 – 10.9
25.	Dorsal fin, length of base	14.0 – 19.4	15.8 – 19.1
26.	Dorsal fin, anterior insertion to tip along anterior edge	17.5 – 21.4	18.3 – 21.3
27.	Dorsal fin, posterior insertion to tip along posterior edge	11.3 – 13.7	9.3 – 13.3
28.	Dorsal fin, anterior insertion to posterior edge (minimum)	12.6 – 15.3	13.9 – 16.3
29.	Width of tail flukes, tip to tip	23.8 – 28.1	23.0 – 28.4
30.	Anterior insertion of tail fluke to notch	6.8 – 8.3	6.9 – 8.8
31.	Anterior insertion of tail fluke to tip	15.0 – 18.2	14.2 – 18.2
32.	Distance, tip of tail fluke to notch	10.7 – 14.5	12.7 – 15.1

Two females were pregnant and the body length of their fetuses, both female, were 205 mm and 530 mm. Their external measurments are listed on Appendix I.

The shape of dorsal fin and tail flukes coincides with that drawn by Yamada (1954). But the flipper is more concaved at the posterior edge and convex at the anterior than the figure of Yamada (1954), so it somewhat resembles with that of *Globicephala* but its length is definitely much shorter. This configuration of the flipper is seen not only in the adult but also in the fetus. The posterior edges of the dorsal fin, flipper and tail flukes of all specimens except the fetuses are indented irregularly. So we think that this shape is formed after birth.

The shape of the head region of our specimens differs from the figure drawn by Yamada (1954), which is a figure reconstructed from the flensed specimen. On his figure the head is too slender. Our specimens show a more globular head with well developed melon.

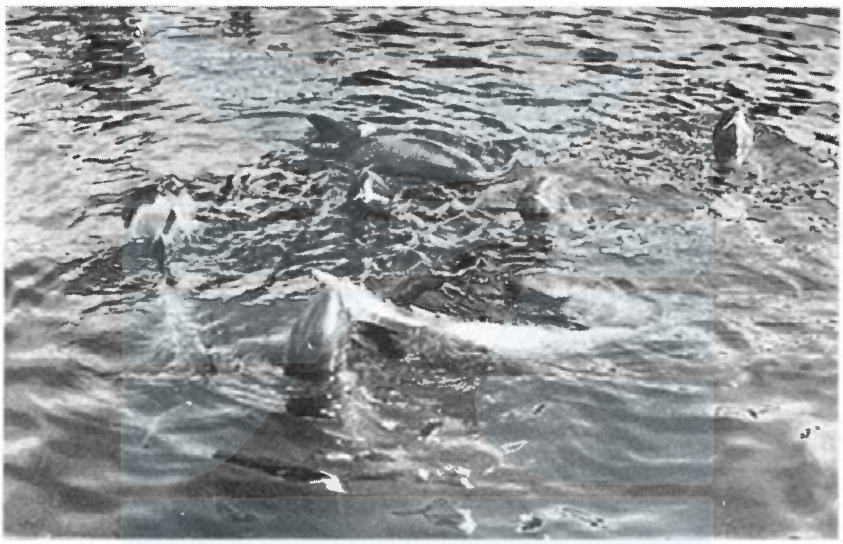

Fig. 5. *Feresa* Gray swimming perpendicularly in the pool of a aquarium.

The true position of the flipper seems to be some what anterior than that on his figure. As the position on his figure is an assumed one, it must be incorrect.

A ventral groove was found on the Futo specimens, which starts at the middle point between the flippers and extend in increasing depth to the urinogenital groove. A external beak was not present on our Futo specimens.

The better part of the dorsal surface, head, throat and both side of flipper and tail flukes are coloured bluish black. The inguinal area is covered with a oval white area in which anus and reproductive aperture open. The breast, the area between the two flippers is gray, its boundary area is indistinct and changes gradually into the surrounding bluish black.

The upper and lower lips have irregular white area which seems to be formed after birth.

Above mentioned white or gray areas are easily observed on a carcass, and there is another pale area which is very indistinct on a carcass. It covers most of the flank, from the insertion of tail flukes to the area around the eye, and most of the ventral surface. Its upper margin starts in front of the eye and, increasing its height, attains its maximum height at nearly the middle point of axilla and the anterior insertion of dorsal fin, and then decreases its height till the lowest point near the dorsal fin, then it extend obliquely upward and finally reaches the anterior insertion of flipper. The lower border begins at the same point as the upper and reaches the axilla, and the two pale areas of the left and the right sides untie at the ventral surface immediately posterior to the oval reproductive area.

Fig. 6. *Feresa* Gray swimming horizontally in the same pool as Fig. 5, notice the pale area on the flank.

CLASSIFICATION INTO SPECIES

Table 3 shows the skull measurements shown in per cent of total skull length of the specimens of the genus *Feresa* already reported, and the ranges of the Futo specimens. Each measurement of the already reported 4 specimens fits fairly well into the range of the Futo specimens. In our specimen the breadth of rostrum at base seems to increase with the body length. B.M. 362 A has a large value on this measurement, which would be due to the advanced age of the specimen. Though the length of the maxillary tooth row is longer in B.M. 362 A and in B.M. 1672 A than in our specimens, this could be due to the difference of the measured points.

In the Futo specimens the depth of temporal fossa is larger in the right side than the left, and the measurements of B.M. 362 A and B.M. 1672 A fall within the range of right side in our specimens. The length of mandibular symphysis is very

short in Taiji specimen comparing with other specimens, it may be due to the difference of point measured.

As mentioned above the breadth of rostrum at base seems to increase with age, other difference of the shape of skull due to age or sex can not be found.

When their small body length (shorter than 250 cm), number of teeth and the shape of skull are considered, our Futo specimens cannot be classified out of the genus *Feresa* Gray. And all of them are classified into *Feresa attenuata* Gray (1875).

TABLE 3. SKULL MEASURMENTS SHOWN IN PER CENT OF TOTAL SKULL LENGTH

	B.M. 362A	B.M. 1672A	Taiji specimen	Yenn specimen	Range in 6 male Futo specimens	Range in 6 female Futo specimens
1. Total (condylo-basal) length	362 mm	350 mm	385 mm	347 mm	356–380 mm	365–390 mm
2. Length of rostrum (medium)	47.4%	48.0%	47.8%	47.5%	44.7–49.2%	47.2–48.4%
3. Breadth of rostrum at base	33.2	30.3	30.2	31.1	27.7–31.7	28.9–31.8
4. Breadth of rostrum at middle	24.6	21.4	23.1	24.3	23.4–25.1	22.9–24.7
5. Breadth of premaxillae at middle of rostrum	16.9	14.9	14.8	15.5	16.1–17.4	15.0–17.7
6. Greatest breadth of premaxillae	25.1	26.0	22.6	25.4	23.4–26.2	23.7–25.0
7. Distance from tip of rostrum to anterior margin of superior nares	62.4	63.2	59.2	61.3	60.7–63.2	56.9–62.6
8. Breadth across orbits	58.3	57.4	56.1	56.4?	56.5–60.7	53.7–58.6
9. Breadth across posterior margins of temporal fossae	42.3	49.4	40.3	42.3	38.4–44.0	40.3–42.7
10. Length of temporal fossa	25.4	24.0	24.2	24.7	24.0–27.9	22.0–27.1
11. Depth of temporal fossa L.	20.2	21.1	17.4	—	17.2–19.2	16.9–19.4
R.			19.8	21.0	18.3–22.3	17.6–23.7
12. Length of maxillary tooth row L.	35.6	36.3	30.7	31.7	29.5–31.8	27.6–32.0
R.			31.4	31.7	29.5–32.1	26.1–33.3
13. Length of mandibular ramus L.	79.8	80.0	73.7	78.3?	72.2–79.4	75.8–79.2
R.					72.2–79.9	76.3–79.5
14. Length of mandibular symphysis	8.3	9.7	7.8	9.0	8.9–10.0	8.7–10.1
15. Length of mandibular tooth row L.	37.3	38.0	36.4	36.3	33.9–37.0	31.5–37.5
R.			36.9	36.3	35.0–37.6	33.1–38.4
16. Depth between angle and coronoid process L.	21.8	20.9	21.3		22.0–22.8	20.8–23.8
R.			21.3		22.6–23.6	20.8–24.1
17. Number of alveoli	11 | 11 / 11 | 10	11 | 12 / 12 | 13	11 | 10 / 13 | 13	10 | 10 / 13 | 13	10–11 | 9–10 / 12 | 12–13	10–11 | 8–10 / 11–13 | 11–13

The length/breadth ratios of skull and rostrum of the Futo specimens fall between 1.50 and 1.78 and between 1.42 and 1.73 respectively, which, as mentioned by Nishiwaki (1963), shows, in conjunction with the number of teeth, that the genus *Feresa* comes within the range of Globicephalidae advocated by Nishiwaki (1963) and is especially akin to the genus *Pseudorca*.

OSTEOLOGICAL NOTES

The vertebral formulae and the number of the vertebrae, ribs and chevron bones are shown in Table 4. The uncinate transverse process on 7th dorsal vertebra pointed out by Yamada (1954) exist on the Futo specimens (Fig. 7). Distance be-

TABLE 4. NUMBER OF VERTEBRAE, RIBS AND CHEVRON BONES OF FUTO SPECIMENS

Specimen No.		1	2	3	5	6
Number of vertebrae	C. (fused)	7 (1–3)	7 (1–3)	7 (1–4)	7 (1–3)	7 (1–6)
	D.	12	12	12	13	13
	L.	17	17	16	16	15
	Ca	34	32	34	33	34
	Sum	70	68	69	69	69
Number of ribs	L. (two headed)	12 (6)	12 (6)	12 (5)	12 (7*)	12 (6)
	R. („)	12 (6)	12 (6)	12 (5)	12 (6)	12 (6)
Number of sternal ribs	L.	8	8	8	8	8
	R.	9	8	8	8	8
Number of cervical ribs	L.	1	—	—	—	—
	R.	—	—	—	—	—
Number of chevron bones		25	26	26	25	25
Centrum of vertebra ankylosed with epiphyses		Completed	Completed	Completed	Completed	Completed

7	8	9	10	11	12	13	14
7 (1–3)	7 (1–3)	7 (1–3, 4–5)	7	7 (1–3)	7 (1–3)	7 (1–4)	7 (1–3)
12	12	13	13	13	12	13	12
16	16	16	16	15	17	16	16
31+	34	33	33	34+ (1)	33	34	32+ (1)
66+	69	69	69	69+ (1)	69	70	67+ (1)
12 (5)	12 (6*)	13 (6*)		12 (6)	12 (5)	12 (6)	12 (5)
12 (5)	12 (6)	12 (6*)	13 (6)	12 (7*)	12 (5)	12 (7*)	12 (5)
9	8	8		9	8	9	5+
9	8	8	9	9	8	9	5+
—	—	—		—	—	—	1
—	—	—	—	—	—	—	—
21	26	27		22	22	27	23
Completed	Completed	C 1–7		Completed	C 1–D 2 Ca 12–33	C 1–5 Ca 25–34	C 1–5 Ca 24–32

* Head of the last two headed rib is separated from the rib.

TABLE 5. PHALANGEAL FORMULAE OF FUTO SPECIMENS

Specimen	1		2		3		5		7		8		9		10		11		12		14	
No.	L.	R.	L.	R.	L.	R.	L.	R.	L.	R.	L.	R.	L.	R.	L.	R.	L.	R.	L.	R.	L.	R.
I	3	3	3	3	3	3	2	2	2	2	2	2	3	3		3	2	2	2	2	2	2
II	8	8	9	9	9	9	10	10	8	8	8	8	9	9		9	8	8	8	8	9	8
III	7	7	8	8	8	8	8	8	7	7	7	7	7	7		8	7	7	7	7	7	7
IV	4	4	4	4	5	5	4	4	4	4	4	5	3	4		5	4	4	4	4	4	4
V	2	3	2	3	3	3	—	2	2	2	2	2	2	2		2	2	2	2	2	2	2

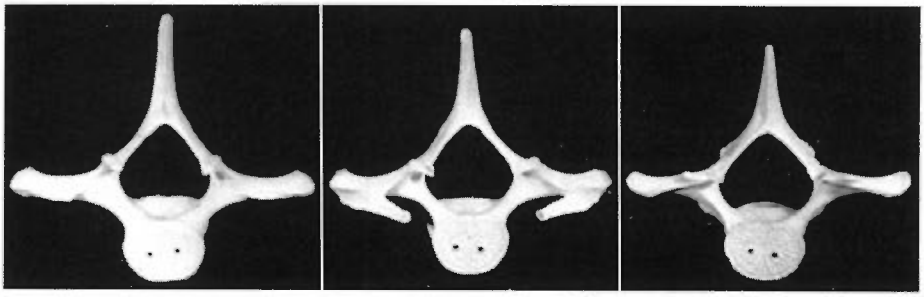

Fig. 7. Cranial views of dorsal vertebrae, showing the uncinate transverse process on the 7th, left to right: 6th, 7th and 8th. (specimen No. 12).

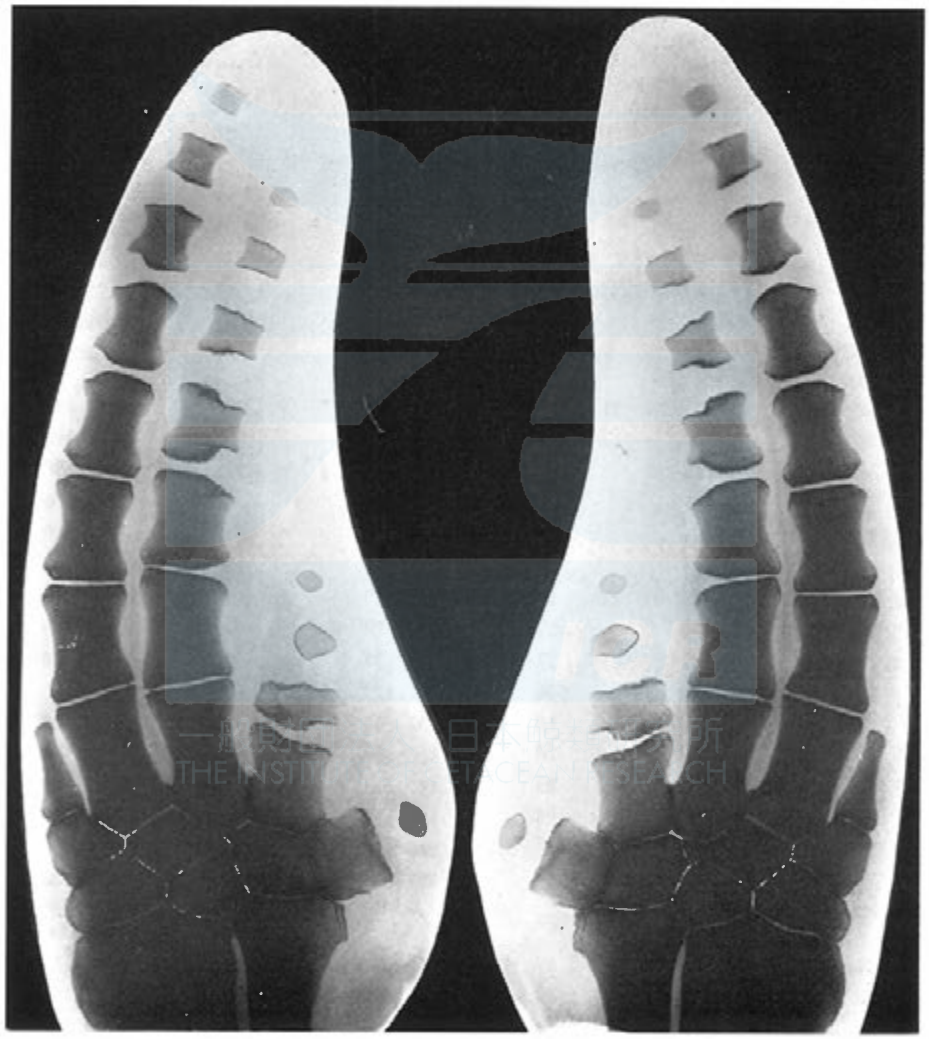

Fig. 8. Xray photograph of left (left) and right (right) flippers. (specimen No. 11).

TABLE 6. DIMENSIONS OF VERTEBRAE (mm)

Specimen No.	Vertebra No.	6 A	6 B	6 C	6 D	6 E	6 F	6 G	8 A	8 B	8 C	8 D	8 E	8 F	8 G	12 A	12 B	12 C	12 D	12 E	12 F	12 G
C	1		94	136										25	44				99	140	28	43
	2								21[2]			87	140			25[2]			—	105		
	3															6			—	66		
	4	42[1]							6			64	52			6			69	53		
	5								5			61	48			6			70	50		
	6				65	48			6			60	54			9			73	52		
	7	8	33	41	70	76	30	37	9	30	46	60	80	28	40	10	33	45	72	79	26	33
D	1	12	31	42	71	109	29	40	12	29	39	62	107	29	44	14	31	40	94	106	31	38
	2	19			92	116			16			68	109			20			96	116		
	3	23			95	119			22			74	112			25			96	118		
	4	27			111	120			26			87	113			28			98	116		
	5	29			117	119			28			89	116			30			100	118		
	6	30			111	121			30			97	118			31	28	33	105	122	35	38
	7	32	29	32	137	121	42	39	31	30	32	102	123	38	37	32	29	33	108	126	35	38
	8	32			120	130			32			107	128			34			113	129		
	9	33			122	135			32			107	131			35			117	140		
	10	33			128	148			32			105	147			35			120	157		
	11	34			132	178			32			105	182			35			123	182		
	12	33			135	208			32			93	181			33			129	194		
	13	32			145	219			—	—	—	—	—	—	—	—	—	—	—	—	—	—
L	1	32	33	36	153	216	31	21	31	32	36	117	183	27	19	33	32	35	135	196	30	21
	2	30			158	214			31			130	183			33			141	197		
	3	30			164	221			30			137	185			32			147	198		
	4	29			168	218			29			144	191			32			149	198		
	5	29			171	215			28			149	186			32			153	199		
	6	28			175	210			28			148	188			30			155	198[4]		
	7	27	35	39	173	205	34	17	28			153	182			30	34	38	155	196[4]	32	15
	8	27			175	203			27	35	38	156	179	28	14	30			156	188		
	9	27			173	195			27			157	175			29			154	188		
	10	28			173	190			26			157	173			29			154	185		
	11	27			170	184			26			157	166			28			151	183		
	12	28			168	180			26			155	157			28			151	176		
	13	27			164	177			26			148	149			30			149	170		
	14	27			159	173			26			147	145			30			147	164		
	15	28			146	171			26			145	141			30			145	160		
	16	—	—	—	—	—	—	—	27			137	135			31			139	154+		
	17	—	—	—	—	—	—	—	—	—	—	—	—	—	—	31	40	41	129	150	15	9
Ca	1	28	41	41	149	167	26	11	27	41	41	136	131	16	10	31	41	42	131	148	23	8
	2	28			144	161			27			131	129			29			127	143		
	3	27			136	159			26			125	126			29			122	136		
	4	27			130	150			26			123	123			29			115	131		

Table 6. Dimensions of vertebrae (continued)

Specimen No.	Vertebra No.	6							8							12						
		A	B	C	D	E	F	G	A	B	C	D	E	F	G	A	B	C	D	E	F	G
Ca	5	27			128	141+			27			120	122			28			112	129		
	6	27			122	144[4]			26			117	115			28			108	123		
	7	26			116	136[4]			25			114	110			29			104	113		
	8	26			112	128[4]			25			110	107			28			100	107		
	9	26			108	120[4]			26			106	100			30			96	103		
	10	26			101	113			26			102	95			30			91	98		
	11	27	41	44	99	105	9	5	26	41	42	98	86	15	5	32	41	40	88	90	10	4
	12	27			92	96			26			94	88			31			86	83		
	13	28			91	83			27			91	72			31			78	74		
	14	29			83	61			28			92	72			32			78	66		
	15	29			85	71+			29			86	65			32			77	58		
	16	31			79	56			30			84	60			33			71	52		
	17	31			75	51			31			79	53			33			70	47		
	18	32			73	48			32			74	49			33			67	42		
	19	31			66	43			32			71	44			34			64	38		
	20	32			60	39			33	41	38	62	36	4	4	34	41	33	59	35	1	1
	21	32			60	37			34			57	34			33			52	33		
	22	32	43	36	55	34	1	2	33			52	32			28			45	31		
	23	30			51	32			31			45	32			21			39	34		
	24	26			40	32			27			38	35			16			30	35		
	25	19			34	35			20			32	38			14			24	36		
	26	16			28	34			16			25	38			12			20	35		
	27	14			22	32			15			21	38			12			18	33		
	28	12			20	32			14			18	34			11			18	30		
	29	12			19	30			12			18	29			10			14	27		
	30	11			17	27			10			11	27			9			12	23		
	31	10			14	22			8			13	23			8			8	19		
	32	9			11	19			7			10	19			7			7	14		
	33	10			8	16			14[3]			7	14			—	—	—	—	—	—	—
	34	11			6	12						5	11			—	—	—	—	—	—	—

A =Length of body at center
B =Height of body at front end
C =Breadth of body at front end
D =Total height from anterior bottom
E =Bilateral breadth of transverse processes
F =Greatest height of neural canal
G =Greatest breadth of neural canal

1): Six are united.
2): Three are united.
3): Two are united.
4): doubled the left half

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TABLE 7. DIMENSIONS OF TEETH OF FUTO SPECIMENS (mm)

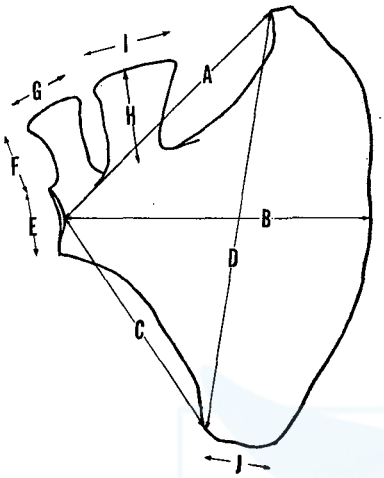
Specimen No.		6				8				12	
		Length		Diameter		Length		Diameter		Diameter	
No. of teeth		L.	R.	L.	R.	L.	R.	L.	R.	L.	R.
Maxillaly teeth	1	19	18	5	5	17	7	7	3	7	6
	2	20	21	6	6	20	16	6	5	7	7
	3	21	22	7	6	18	15	8	5	8	7
	4	21	21	7	7	19	19	7	6	8	8
	5	20	21	7	7	19	+	6	6	8	8
	6	19	20	7	7	17	19	8	7	8	8
	7	19	19	7	6	17	18	7	7	7	8
	8	17	17	6	6	16	18	7	7	7	7
	9	15	16	6	5	16	16	7	7	7	7
	10	10	—	4	—	14	15	6	6	6	7
Mandibular teeth	1	16	16	7	6	20	+	7	6	6	6
	2	19	19	7	7	20	+	8	7	6	6
	3	21	21	8	7	20	19	8	8	6	6
	4	22	21	8	7	21	20	8	8	6	6
	5	22	23	8	8	21	22	8	8	7	6
	6	24	23	8	7	21	22	8	8	7	6
	7	23	23	7	7	21	22	8	8	5	6
	8	23	23	7	8	21	22	8	8	4	5
	9	21	22	7	7	21	21	8	8	4	6
	10	22	19	7	6	22	21	8	8	4	5
	11	20	21	6	6	19	20	7	7	—	4
	12	8	18	4	6	3	—	2	—	—	—
	13	—	16	—	5	—	—	—	—	—	—

TABLE 8. DIMENSIONS OF RIBS OF FUTO SPECIMENS (mm)

Specimen No.		6						8						12					
		A		B		C		A		B		C		A		B		C	
No. of ribs		L.	R.	L.	R.	L.	R.	L.	R.	L.	R.	L.	R.	L.	R.	L.	R.	L.	R.
Vertebral ribs	1	178	172	25	24	21	22	170	170	22	25	19	20	189	192	21	22	20	20
	2	312	320	16	16	25	24	297	298	16	26	20	20	326	324	18	19	23	21
	3	381	379	12	12	28	29	350	348	13	14	26	25	390	393	17	12	24	29
	4	413	412	10	10	28	29	382	383	12	12	26	27	420	413	9	9	27	29
	5	420	420	11	11	25	26	397	408	11	12	25	26	427	427	9	9	26	25
	6	420	418	11	11	26	26	380	405	11	11	25[2]	24	398	392	8	9	29[1]	29[1]
	7	388	384	11	11	28[1]	27[1]	360	377	11	10	—	—	390	380	8	9	—	—
	8	382	382	9	10	—	—	Ca374[3]	365	11	10	—	—	380	372	8	8	—	—
	9	373	376	8	8	—	—	358	350	10	10	—	—	354	348	7	8	—	—
	10	347	351	8	8	—	—	326	338	9	9	—	—	327	323	7	7	—	—
	11	330	332	8	8	—	—	290	292	9	9	—	—	298	294	6	6	—	—
	12	291	283	6	7	—	—	241	237	7	7	—	—	231	223	5	4	—	—
	13	—	136	—	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sternal ribs	1	100	96	17	12			95	96	16	16			98	94	16	18		
	2	105	103	17	12			98	97	12	12			97	96	9	9		
	3	113	110	11	10			118	112	9	9			107	108	7	8		
	4	114	116	9	9			117	117	10	9			106	116	7	7		
	5	122	128	7	6			133	129	8	7			123	124	5	5		
	6	137	139	5	6			142	136	7	7			138	132	6	4		
	7	158	156	7	7			141	143	6	6			124	128	6	6		
	8	118	118	6	6			120	103	5	5			95	84	4	4		

A : Length along visceral border
B : Breadth at middle
C : Distance between two heads
1) Length of the process on uncinate transverse process
2) Head is separated from the rib
3) Broken

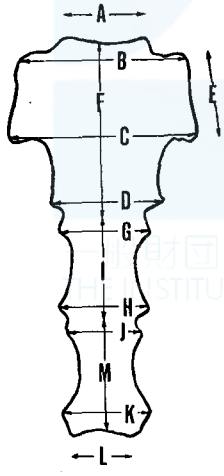
TABLE 9. DIMENSIONS OF SCUPULAE OF FUTO SPECIMENS (mm)



Specimen No.	6		8		12	
	L.	R.	L.	R.	L.	R.
A	—	—	142	143	147	148
B	165	165	143	142	152	150
C	—	—	123	127	120	122
D	—	—	225	229	210	210
D′	227	232	—	—	258	251
E	37	35	35	35	35	35
E′	28	28	28	29	29	29
F	42	43	40	42	45	40
G	34	37	25	32	36	37
H	45	43	50	47	45	58
I	60	57	48	48	41	46
J	57	56	57	46	34	31

D′ : Length along vertebral border
E′ : Breadth of grenoid cavity

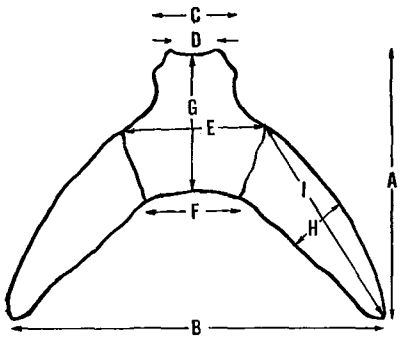
TABLE 10. DIMENSIONS OF STERNUMS OF FUTO SPECIMENS (mm)



Specimen No.	6	8[1]	12
A	47	36	38
B	80	75	84
C	97	88	89
D	60	58	57
E L.	47	32	35
R.	47	30	36
F	92	93	93
G	48	43	43
H	48	38	40
I	57	67	61
J	37	32	31
K	45	32	26
L	35	20	7
M	60	48	45
Total length	—	157 (1–II)	192

1) 2nd and 3rd segments are separated, and their length of facets are measured 22 and 24 respectively.

TABLE 11. DIMENSIONS OF HYOID BONES OF FUTO SPECIMENS (mm)



Specimen No.		6	8	12
A		103	86	101
B		136	113	131
C		30	28	33
D		15	12	18
E		69	63	65
F		46	36	37
G		54	55	50
H	L.	25	27	25
	R.	26	27	25
I	L.	80	64	75
	R.	78	67	70
Stylohyals straight length	L.	41	82	98
	R.	90	83	100
„ breadth at middle	L.	13	15	15
	R.	14	15	16

TABLE 12. DIMENSIONS OF CHEVRON BONES OF FUTO SPECIMENS

Specimen No.	6		8		12	
No. of chevron	A	B	A	B	A	B
1	L. 22		L. 19		L. 30	
	R. 24[1)]		R. 18		—	
2	L. 18		L. 24[2)]		29	18
	R. 28[1)]		R. 23			
3	27	20	L. 26[2)]		31	19
			R. 25			
4	27	21	27	21	39	20
5	36	22	27	22	45	20
6	49	24	34	23	48	21
7	52	23	40	24	49	21
8	54	23	41	24	47	21
9	54	23	39	23	46	20
10	53	24	39	23	46	20
11	50	23	45	25	43	21
12	49	24	45	26	43	21
13	47	25	45	27	41	21
14	45	25	40	27	37	21
15	41	25	40	26	30+	21
16	39	25	37	26	35	21
17	37	24	34	26	30	21
18	34	23	32	25	27	21
19	32	23	30	25	25	20
20	28	22	27	24	19	18
21	24	20	23	22	14	16
22	18	18	19	19	12	16
23	11	16	15	19	R. 7	—
24	10	13	12	18	—	—
25	L. 7	—	L. 9	—	—	—
	R. 7	—	R. 9	—	—	—
26	—	—	L. 5	—	—	—
	—	—	R. 4	—	—	—

A: Total height, B: Maximum breadth across the laminae

1), 2) fused together

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tween the tips of the processes of specimen Nos. 6, 8 and 12 are 54 (D 7),77 (D 7) and 57 mm (D 6) respectivery.

Table 5 and Fig. 8 show the pharangeal formulae and the X ray photograph of the flippers.

The dimensions of skeleton except skull are shown in Tables 6–13.

TABLE 13. DIMENSIONS OF PELVIC BONES OF FUTO SPECIMENS (mm)

Specimen No.	Straight lengt		Breadth at middle	
	L.	R.	L.	R.
6	105	105	12	12
8	118	115	14	10
12	122	121	11	11

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REFERENCES

CADENAT, J. (1958). Notes sur les delphinidés Ouest-Africains. II-Un specimen du genre *Feresa* capturé sur les cotes du Sénégal. *Extrait. Bull. Inst. Francais L'afrique Noire.* XX, A, 4; 1486–91.

HALL, E. R. & KELSON K. R. (1959). The mammals of north America. II : 1–830.

NISHIWAKI, M. (1963). Taxonomical consideration on genera of delphinidae. *Sci. Rep. Whales Res. Inst.*, 17 : 93–103.

—— (1964). Revision of the article "Taxonomical consideration on genera of *Delphinidae*" in No. 17. *Sci. Rep. Whales. Res. Inst.*, 18 : 171–172

YAMADA, M. (1954). An account of a rare Porpoise, *Feresa* Gray from Japan. *Sci. Rep. Whales Res. Inst.*, 9 : 59–88.

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APPENDIX I EXTERNAL MEASURMENTS

Point of measurment	Specimen No.	1		2		3		8	
	Sex	M		M		M		M	
		cm	%	cm	%	cm	%	cm	%
1. Length, total		240	100.0	217	100.0	215	100.0	229	100.0
2. Length, tip of upper jaw to center of eye		21.0	8.7	22.0	10.1	24.5	11.4	20.0	8.7
3. Length of gape		13.0	5.4	13.0	6.0	12.0	5.6	14.5	6.3
4. Center of eye to external auditory meatus (direct)		L. 9.5	4.0	R. 7.5	3.5	L. 7.0	3.3	L. 7.0	3.1
5. Length, center of eye to angle of gape		L. 8.0	3.3	9.0	4.1	12.5	5.8	5.5	2.4
6. Length, tip of upper jaw to blowhole		16.0	6.7	21.0	9.7	25.5	11.9	22.0	9.6
7. Anteriormost point of gape to blowhole along the melon		40.0	16.7	37.5	17.3	39.0	18.1	39.0	17.0
8. Length, tip of upper jaw to anterior insertion of flipper		L. 41.5	17.3	—	—	46.5	21.6	38.5	16.8
		R. —	—	—	—				
9. Length, anterior insertion of flipper to axilla		L. —	—	—	—	14.5	6.7	15.0	6.6
		R. —	—	—	—	—	—	—	—
10. Length, tip of upper jaw to tip of dorsal fin		—	—	134.0	61.8	131.0	60.9	125.5	54.8
11. Length, tip of upper jaw to midpoint of umbilicus		100.0	41.7	93.0	42.9	83.0	38.6	100.5	43.9
12. Length, tip of upper jaw to midpoint of genifal aperture		131.0	54.6	122.0	56.2	113.5	52.8	124.5	54.4
13. Length, tip of upper jaw to center of anus		158.0	65.8	145.0	66.8	135.5	63.0	149.5	65.3
14. Projection of upper jaw beyond the lower		6.0	2.5	4.0	1.8	2.0	0.9	3.7	1.6
15. Girth, at anterior insertion of flipper		119.0	49.6	—	—	—	—	109.0	47.6
16. Girth, at anterior insertion of dorsal fin (maximum)		143.0	59.6	—	—	139.0	64.7	143.0	62.4
17. Maximum height of body, including dorsal fin		76.0	31.7	—	—	68.0	31.6	70.0	30.6
18. Length of eye		3.0	1.2	2.5	1.2	3.0	1.4	2.4	1.0
19. Width of blowhole		—	—	4.0	1.8	3.0	1.4	4.8	2.1
20. Length of flipper, anterior insertion to tip		L. 48.0	20.0	—	—	47.5	22.1	43.5	19.0
		R. 49.0	20.4	43.0	19.8	—	—	42.0	18.3
21. Length of flipper, along anterior edge		L. 53.5	22.3	—	—	50.5	23.5	46.5	20.3
		R. 53.5	22.3	47.0	21.7	—	—	—	—
22. Length of flipper, axilla to tip		L. 36.0	15.0	—	—	35.0	16.3	32.0	14.0
		R. 37.0	15.4	33.5	15.4	—	—	31.5	13.8
23. Width of flipper, maximum		L. 15.5	6.5	—	—	15.0	7.0	14.5	6.3
		R. 15.5	6.5	15.0	6.9	—	—	14.0	6.1
24. Dorsal fin, height		24.0	10.0	22.0	10.1	25.0	11.6	22.5	9.8
25. Dorsal fin, length of base		40.0	16.7	42.0	19.4	39.0	18.1	32.0	14.0
26. Dorsal fin, anterior insertion to tip along anterior edge		—	—	—	—	46.0	21.4	40.0	17.5
27. Dorsal fin, posterior insertion to tip along posterior edge		—	—	—	—	29.5	13.7	26.5	11.6
28. Dorsal fin, anterior insertion to posterior edge (minimum)		—	—	—	—	33.0	15.3	30.0	13.1
29. Width of tail flukes, tip to tip		59.0	24.6	61.0	28.1	54.5	25.3	62.5	27.3
30. Anterior insertion of tail fluke to notch		L. 18.0	7.5	18.0	8.3	15.5	7.2	17.0	7.4
		R. 18.0	7.5	18.0	8.3	—	—		
31. Anterior insertion of tail fluke to tip		L. 36.0	15.0	37.5	17.3	35.5	16.5	38.5	16.8
		R. 36.0	15.0	37.5	17.3	—	—	—	—
32. Distance, tip of tail fluke to notch		L. 30.0	12.5	31.0	14.3	28.5	13.3	32.5	14.2
		R. 30.5	12.7	31.5	14.5	—	—	—	—

1) fetus of No. 11 2) fetus of No. 12

9 M		10 M		14 M		4 F		5 F		6 F	
cm	%	cm	%	cm	%	cm	%	cm	%	cm	%
223	100.0	244	100.0	214	100.0	215	100.0	225	100.0	225	100.0
21.0	9.4	22.5	9.4	22.5	10.5	21.0	9.8	22.0	9.8	22.5	10.0
15.0	6.7	15.0	6.1	15.5	7.2	14.5	6.7	13.5	6.0	16.0	7.1
6.7	3.0	L. 7.7	3.2	7.0	3.3	R. 7.0	3.3	R. 8.5	3.8	L. 7.5	3.3
6.0	2.7	8.0	3.3	7.0	3.3	6.5	3.0	8.5	3.8	6.5	2.9
23.5	10.5	24.5	10.0	23.0	10.7	18.5	8.6	20.0	8.8	23.5	10.4
38.0	17.0	39.0	16.0	32.5	15.2	36.0	16.7	38.0	16.9	38.5	17.1
46.0	20.6	46.0	18.9	40.0	18.7	44.0	20.5	48.0	21.3	44.0	19.6
			—	41.0	19.2						
15.0	6.7	16.0	6.6	13.5	6.3	—	—	15.0	6.7	9.0	4.0
		—	—	13.0	6.1	10.0	4.7			—	—
131.0	58.7	138.0	56.6	122.0	57.0	128.5	59.8	130.0	57.8	125.0	55.6
100.5	45.1	96.5	39.5	94.0	43.9	90.0	41.9	101.0	44.9	100.0	44.4
114.5	51.3	127.0	52.0	117.0	54.7	126.0	58.6	130.0	57.8	133.5	59.3
140.0	62.8	156.0	63.9	139.0	65.0	132.0	61.4	148.0	65.8	145.5	64.7
3.0	1.3	3.0	1.2	5.0	2.3	3.0	1.4	3.5	1.6	3.5	1.6
108.0	48.4	111.0	45.5	105.0	49.1	109.5	50.9	110.0	48.9	102.5	45.6
132.0	59.2	141.0	57.8	112.5	52.6	130.0	60.5	135.0	60.0	136.5	60.7
66.0	29.6	73.0	29.9	54.0	25.2	65.0	30.2	64.0	28.4	70.5	31.3
3.0	1.3	2.5	1.0	3.0	1.4	2.0	0.9	2.5	1.1	2.0	0.9
3.5	1.6	4.0	1.6	3.5	1.6	3.5	1.6	3.0	1.3	3.5	1.6
47.0	21.1	50.0	20.5	40.0	18.7	—	—	—	—	44.5	19.8
		—	—	41.0	19.2	40.0	18.6	50.0	22.2	—	—
53.5	24.0	54.0	22.1	43.5	20.3	—	—	—	—	48.5	21.6
		—	—			44.0	20.5	55.0	24.4	—	—
36.5	16.4	38.0	15.6	31.0	14.5	—	—	—	—	33.0	14.7
		—	—	30.5	14.3	32.0	14.9	37.0	16.4	—	—
14.0	6.3	15.0	6.1	13.0	6.1	—	—	—	—	13.0	5.8
		—	—	13.0	6.1	12.5	5.8	15.0	6.7	—	—
21.0	9.4	26.0	10.7	23.0	10.7	22.0	10.2	24.5	10.9	23.0	10.2
32.0	14.3	38.0	15.6	34.0	15.9	34.0	15.8	38.0	16.9	43.0	19.1
42.5	19.1	47.5	19.5	37.5	17.5	40.0	18.6	48.0	21.3	46·0	20.4
28.0	12.6	27.5	11.3	24.5	11.4	24.0	11.2	21.0	9.3	30.0	13.3
28.0	12.6	34.0	13.9	27.5	12.9	32.5	15.1	33.0	14.7	34.0	15.1
56.0	25.1	58.0	23.8	53.0	24.8	49.5	23.0	64.0	28.4	60.5	26.9
17.0	7.6	16.5	6.8	15.0	7.0	—	—	—	—	—	—
				15.0	7.0	15.0	7.0	15.5	6.9	19.0	8.4
40.5	18.2	42.0	17.2	34.0	15.9	—	—	—	—	—	—
		—	—	34.5	16.1	38.0	17.7	41.0	18.2	32.0	14.2
30.5	13.7	34.0	13.9	23.5	11.0	—	—	—	—	—	—
		—	—	23.0	10.7	30.0	14.0	34.0	15.1	31.5	14.0

	7 F		11 F		12 F		13 F		15[1] F		16[2] F	
	cm	%	cm	%	cm	%	cm	%	cm	%	cm	%
1.	221	100.0	227	100.0	221	100.0	208	100.0	20.5	100.0	53.0	100.0
2.	18.0	8.1	24.5	10.8	22.5	10.2	21.5	10.3	2.4	11.7	7.2	13.6
3.	15.0	6.8	17.0	7.5	18.5	8.4	13.5	6.5	1.6	7.8	5.5	10.4
4.	L. 7.0	3.2	L. 7.5	3.3	8.0	3.6	R. 7.0	3.4	L. 1.2	5.9	L. 2.5	4.7
5.	L. 3.0	1.4	L. 7.5	3.3	4.0	1.8	R. 8.0	3.8	L. 0.8	3.9	L. 1.5	2.8
6.	20.0	9.0	23.0	10.1	24.5	11.1	15.0	7.2	1.9	9.3	6.9	13.0
7.	36.0	16.3	38.0	16.7	37.5	17.0	34.0	16.3	3.4	16.6	10.0	18.9
8,	41.0	18.6	46.0	20.3	44.5	20.1	—	—	5.1	24.9	13.2	24.9
	—	—	—	—			41.3	19.9	—	—	—	—
9.	15.0	6.8	14.5	6.4	15.5	7.0	—	—	1.4	6.8	4.2	7.9
			—	—			13.5	6.5	—	—	—	—
10.	120.0	54.3	137.0	60.0	134.0	60.6	120.0	57.7	11.6	56.6	33.9	64.0
11.	98.5	44.6	96.0	42.3	89.0	40.3	91.0	43.7	10.7	52.2	27.6	52.1
12.	135.0	61.1	134.0	59.0	132.0	59.7	127.0	61.1	13.5	65.9	35.0	66.0
13.	142.0	64.3	142.0	62.6	140.0	63.3	133.0	63.9	14.1	68.8	36.6	69.1
14.	4.0	1.8	4.0	1.8	2.0	0.9	4.0	1.9	0.4	2.0	0.2	0.4
15.	119.0	53.8	105.5	46.5	112.0	50.7	101.0	48.6	13.8	67.3	28.5	53.8
16.	140.0	63·3	134.0	59.0	140.0	63.3	117.0	56.2	14.3	69.8	29.8	56.2
17.	71.5	32.4	65.0	28.6	64.0	29.0	56.5	27.2	5.7	27.8	11.5	21.7
18.	2.5	1.1	2.5	1.1	2.5	1.1	2.8	1.3	0.4	2.0	0.8	15.1
19.	4.0	1.8	3.5	1.5	5.0	2.3	3.5	1.7	0.9	4.4	1.1	2.8
20.	—	—	45.0	19.8	46.0	20.8	—	—	3.6	17.6	10.8	20.4
	32.5	14.7	—	—			41.0	19.7	—	—	—	—
21.	—	—	49.5	21.8	50.5	22.9	—	—	3.9	19.0	12.5	23.6
	49.5	22.4	—	—			45.0	21.6	—	—	—	—
22.	—	—	34.0	15.0	34.5	15.6	—	—	2.4	11.7	7.5	14.2
	42.0	19.0	—	—			32.5	15.6	—	—	—	—
23.	—	—	15.0	6.6	14.5	6.6	—	—	1.2	5.9	3.3	6.2
	15.0	6.8	—	—			14.7	7.0	—	—	—	—
24.	22.3	10.1	22.5	9.9	22.5	10.2	20.0	9.6	1.0	4.9	3.6	6.8
25.	35.0	15.8	41.0	18.1	40.0	18.1	33.0	15.9	2.8	13.7	7.7	14.5
26.	41.5	18.8	47.0	20.7	43.0	19.5	38.0	18.3	2.3	11.2	9.1	17.2
27.	25.5	11.5	24.5	10.8	22.0	10.0	23.0	11.1	1.0	4.9	5.0	9.4
28.	31.0	14.0	33.0	14.5	36.0	16.3	29.0	13.9	2.3	11.2	6.5	12.3
29.	60.0	27.1	61.0	26.9	54.5	24.7	51.0	24.5	4.2	20.5	10.3	19.4
30.	—	—	16.5	7.3	16.0	7.2	—	—	1.9	9.3	4.0	7.5
	19.5	8.8	—	—			17.0	8.2	—	—	—	—
31.	—	—	38.5	17.0	37.0	16.7	—	—	3.0	14.6	8.4	15.8
	39.5	17.9	—	—			33.0	15.9	—	—	—	—
32.	—	—	32.5	14.3	31.0	14.0	—	—	2.2	10.7	6.2	11.7
	31.0	14.0	—	—			26.5	12.7	—	—	—	—

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APPENDIX II SKULL MEASURMENTS (mm)

Point of measurment	Specimen No.	1		2		3		8		9	
	Sex	M		M		M		M		M	
	Body Length(cm)	240		217		215		229		223	
			%		%		%		%		%
1. Total (condylo-basal) length		380	100.0	359	100.0	372	100.0	356	100.0	378	100.0
2. Length of rostrum (median)		170	44.7	166	46.2	168	45.2	168	47.2	186	49.2
3. Breadth of rostrum at base		120	31.6	99	27.7	118	31.7	110	30.9	112	29.6
4. Breadth of rostrum at middle		94	24.7	90	25.1	93	25.0	88	24.7	91	24.1
5. Breadth of premaxillae at middle of rostrum		66	17.4	58	16.2	64	17.2	58	16.3	61	16.1
6. Greatest breadth of premaxillae		89	23.4	94	26.2	91	24.5	91	25.6	90	23.8
7. Minimum breadth of premaxillae near the base of rostrum		58	15.3	50	13·9	56	15.1	55	15.4	53	14.0
8. Length of premaxilla	L.	277+	72.9+	263	70.5	273	73.4	257	72.2	291	77.0
	R.	294	77.4	283	78.8	290	78.0	282	79.2	312	82.5
9. Breadth of superior nares		55	14.5	50	13.9	48	12.9	46	12.9	48	12.7
10. Distance from tip of rostrum to bottom of maxillary notch	L.	186	48.9	175	48.7	184	49.5	175	49.2	192	50.8
	R.	186	48.9	175	48.7	183+	49.2+	176	49.4	195	51.6
11. Distance from tip of rostrum to anterior end of vomer		41	10.8	28	7.8	31	8.3	45	12.6	40	10.6
12. Distance from tip of rostrum to anterior margin of superior nares		236	62.1	223	62.1	233	62.6	216	60.7	239	63.2
13. Distance from tip of rostrum to posterior median end of maxillae on palate		182	47.9	172	47.9	171	46.0	163	45.8	187	49.5
14. Distance from tip of rostrum to posterior end of vomer on cranial base (median)		288	75.8	268	74.7	279	75.0	268	75.3	282	74.6
15. Breadth across middle of orbits		215	56.6	218	60.7	212	57.0	206	57.9	221	58.5
16. Breadth across zygomatic processes		235	61.8	240	66.9	232	62.4	229	64.3	239	63.2
17. Breadth across post-orbital processes		230	60.5	238	66.3	230	61.8	224	62.9	237	62.7
18. Height of skull including nasals		190	50.0	188	52.4	183	49.2	180	50.6	191	50.5
19. Breadth across posterior margins of temporal fossae		162	42.6	158	44.0	143	38.4	155	43.5	151	40.0
20. Length of temporal fossa	L.	92	24.2	96	26.7	100	26.9	91	25.6	99	26.2
	R.	99	26.1	100	27.9	99	26.6	86	24.2	100	26.5
21. Depth of temporal fossa	L.	67	17.6	69	19.2	68	18.3	68	19.1	65	17.2
	R.	74	19.5	77	21.4	73	19.6	72	20.2	69	18.3
22. Length of maxillary teeth row	L.	121	31.8	111	30.9	115	30.9	105	29.5	114	30.2
	R.	115	30.3	106	29.5	117	31.5	107	30.1	113	29.9
23. Distance from first tooth to bottom of maxillary notch	L.	176	46.3	175	48.7	179	48.1	168	47.2	182	48.1
	R.	175	46.0	170	47.4	179	48.1	169	47.5	185	48.9
24. Breadth of occipital foramen		43	11.3	39	10.9	38	10.2	40	11.2	39	10.3
25. Height of occipital foramen		39	10.3	38	10.6	36	9.8	37	10.4	41	10.8

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10		14		5		6		7		11		12		13	
M		M		F		F		F		F		F		F	
244		214		225		225		221		227		221		208	
	%		%		%		%		%		%		%		%
395	100.0	368	100.0	365	100.0	372	100.0	372	100.0	380	100.0	390	100.0	375	100.0
193	48.9	175	47.6	175	47.9	180	48.4	179	48.1	181	47.6	184	47.2	183	47.6
		108	29.3	116	31.8	114	30.6	112	30.1	110	28.9	118	30.3	106	29.3
		86	23.4	90	24.7	90	24.2	87	23.4	87	22.9	91	23.3	80	23.4
		60	16.3	62	17.0	60	16.1	62	16.7	62	16.3	69	17.7	56	15.0
		89	24.2	90	24.7	90	24.2	93	25.0	90	23.7	95	24.4	89	24.2
		57	15.5	58	15.9	—	—	58	15.6	57	15.0	58	14.9	49	15.5
		281	76.4	273	74.8	272	73.1	270	72.6	273	71.8	276	70.8	267	76.4
		292	79.3	296	81.1	298	80.1	294	79.0	299	78.7	307	78.7	296	79.3
		47	12.8	51	14.0	51	13.7	46	12.4	48	12.6	49	12.6	47	12.8
		185	50.3	185	50.7	192	51.6	187	50.3	189	49.7	194	49.7	188	50.3
		188	51.1	186	51.0	194	52.2	189	50.8	191	50.3	196	50.3	189	51.1
		37	10.1	29	7.9	39	10.5	33	8.9	33	8.7	46	11.8	45	10.1
		228	62.0	227	62.3	231	62.1	226	56.9	238	62.6	240	61.5	235	62.0
		183	49.7	183	50.1	183	49.2	185	49.8	185	48.7	187	47.9	181	49.7
		277	75.3	270	74.0	284	76.3	278	74.8	285	75.0	298	76.4	281	75.3
		208	56.5	214	58.6	218	58.6	212	56.5	204	53.7	218	55.9	199	56.5
		230	62.5	239	65.5	—	—	235	63.2	229	60.3	242	62.1	219	58.4
		227	61.7	235	64.4	236	63.4	231	62.3	225	59.2	239	61.3	218	61.7
		177	48.1	195	53.4	—	—	179	48.1	184	48.4	—	—	177	47.2
		153	41.6	156	42.7	158	42.5	157	42.2	155	40.8	157	40.3	155	41.6
		96	26.1	95	26.0	87	23.4	83	22.3	90	23.7	94	24.1	92	26.1
		88	24.0	99	27.1	93	25.0	82	22.0	91	23.9	99	25.4	89	24.0
		66	17.9	68	18.6	63	16.9	72	19.4	66	17.4	70	17.9	67	17.9
		82	22.3	74	20.3	70	18.8	88	23.7	67	17.6	74	19.0	77	22.3
		117	31.8	106	29.0	119	32.0	113 (122)	30.4	105	27.6	120	30.8	119	31.8
127	32.2	118	32.1	106	29.0	120	33.3	118	31.7	99 (109)	26.1 (28.7)	120	30.8	112	29.9
		176	47.8	176	48.2	—	—	178	47.8	179	47.1	184	47.2	180	48.0
		181	49.2	176	48.2	—	—	180	48.4	182	47.9	185	47.4	180	48.0
		43	11.7	43	11.8	44	11.8	47	12.6	40	10.5	39	10.0	44	11.7
		40	10.9	43	11.8	35	9.4	42	11.3	36	9.5	36	9.2	37	9.9

26. Breadth across occipital condyles		107	28.2	92	25.6	88	23.7	99	27.8	87	23.0
27. Length of occipital condyle	L.	65	17.1	56	15.6	50	13.4	57	16.0	55	14.6
	R.	65	17.1	56	15.6	52	14.0	57	16.0	55	14.6
28. Length of mandibular ramus	L.	283	74.5	280	78.0	286	76.9	275	72.2	300	79.4
	R.	285	75.0	282	78.6	288	77.4	275	72.2	302	79.9
29. Length of symphysis		38	10.0	34	9.5	33	8.9	34	9.6	36	9.5
30. Length of mandibular teeth row	L.	129	33.9	128	35.7	129	34.7	124	34.8	140	37.0
	R.	133	35.0	131	36.5	134	36.0	125	35.1	142	37.6
31. Length of mandibular hiatus	L.	112	29.5	115	32.0	123	33.1	120	33.7	136	35.8
	R.	110	28.9	115	32.0	124	33.3	118	33.1	134	35.4
32. Depth between angle and coronoid process	L.	85	22.4	81	22.6	82	22.0	79	22.2	86	22.8
	R.	87	22.9	81	22.6	85	22.8	82	23.0	89	23.6
33. Breapth across mandibular condyles		202	53.2	215	59.9	210	56.5	203	57.0	220	58.2
34. Length of tympanic bulla	L.	41	10.8	40	11.1	39	10.5	38	10.7	41	10.8
	R.	41	10.8	41	11.4	38	10.2	38	10.7	41	10.8
35. Greatest breadth of tympanic bulla	L.	26	6.8	24	6.7	24	6.5	23	6.5	24	6.3
	R.	25	6.6	24	6.7	24	6.5	23	6.5	24	6.3
36. Number of alveoli		11 | 10		10 | 9		10 | 10		10 | 10		10 | 9
		12 | 13		12 | 12		12 | 12		12 | 12		12 | 12

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		96	26.1	89	24.4	94	25.3	93	25.0	97	25.5	90	23.1	93	24.8
		51	13.9	55	15.1	54	14.5	56	15.1	58	15.3	58	14.9	53	14.1
		52	14.1	57	15.6	56	15.1	58	15.6	60	15.8	61	15.6	55	14.7
		285	77.4	289	79.2	285	76.6	282	75.8	289	76.1	302	77.4	287	76.5
304	77.0	285	77.4	290	79.5	286	76.9	284	76.3	290	76.3	303	77.7	288	76.8
		35	9.5	36	9.9	33	8.9	37	9.9	33	8.7	37	8.7	38	10.1
		131	35.6	137	37.5	134	36.0	138	37.1	131	34.5	123	31.5	139	37.1
146	37.0	135	36.7	135	37.0	137	36.8	135	36.3	130	34.2	129	33.1	144	38.4
		121	32.9	122	33.4	—	—	110	29.6	120	31.6	130	33.3	120	32.0
		121	32.9	124	34.0	—	—	112	30.1	121	31.8	133	34.1	117	31.2
		81	22.0	87	23.8	85	22.4	82	22.0	81	21.3	86	22.1	78	20.8
		82	22.3	88	24.1	88	23.7	82	22.0	83	21.8	86	22.1	78	20.8
		203	55.2	218	59.7	202	54.3	208	55.9	208	54.7	196	50.3	209	55.7
		40	10.9	40	11.0	41	11.1	38	10.2	40	10.5	42	10.8	39	10.4
		39	10.6	40	11.0	40	10.8	38	10.2	40	10.5	42	10.8	39	10.4
		24	6.5	23	6.3	23	6.2	23	6.3	24	6.3	35	9.0	24	6.4
		24	6.5	23	6.3	23	6.2	23	6.2	24	6.3	35	9.0	24	6.4
		10 | 10		9 | 9		10 | 10		10(11) | 10		9 | 8(9)		10 | 10		10 | 9	
		12 | 12		12 | 12		12 | 13		13 | 12		12 | 11		11 | 12		12 | 13	

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APPENDIX III ORGAN WEIGHTS IN PROPORTION TO THE BODY WEIGHT

The absolute and relative weights of visceral organs are tabulated in the following. The numbers in parentheses show the percentage of each organ weight to the body weight.

	No. 6[2] 225 cm. ♀	No. 11[1] 227 cm. ♀		No. 12[2] 221 cm. ♀		No. 13[1] 208 cm. ♀	
Body weight	—	155.8 kg.		145.5 kg		110 kg.	
Brain	—	1060 g.	(0.68)	1100 g.	(0.76)	940 g.	(0.85)
Heart	840 g.	1080	(0.69)	770	(0.53)	570	(0.52)
Lung L	1880	2470	(1.59)	1855	(1.27)	1650	(1.50)
Lung R	2280	2350	(1.51)	1640	(1.13)	1980	(1.80)
Stomach	1800	2600	(1.67)	1715	(1.18)	940	(0.86)
Spleen	42	85	(0.053)	65	(0.045)	98	(0.089)
Liver	2050	2740	(1.76)	1960	(1.35)	2200	(2.00)
Pancreas	67	90	(0.058)	89	(0.061)	100	(0.091)
Kidney L	295	670	(0.43)	276	(0.019)	340	(0.31)
Kidney R	321	670	(0.43)	246	(0.017)	290	(0.26)
Adrenals L	5	11	(0.0071)	5	(0.0034)	8	(0.0073)
Adrenals R	5	10	(0.0064)	—		8	(0.0073)
Thyroid	11	—		—		9	(0.0082)
Thymus	—	—		—		32	(0.029)
Hypophysis	—	0.8	(0.0051)	—		0.65	(0.0059)
Intestine	4000	4000	(2.56)	3100	(2.13)	3270	(2.97)
„ length	15.2 m.	17.2 m.		14.7 m.		16.4 m.	

1) Each organ was weighed at the autopsy of the fresh cadaver.
2) Each organ was calculated from the value after preservation in formalin.

EXPLANATION OF PLATES

PLATE I

External features of *Feresa attenuata*
Top to bottom:
Lateral view of female fetus, body length 205 mm.
Lateral view of female fetus, body length 530 mm.
Lateral view of adult female.
Dorsal view of adult male.
Ventral view of the same porpoise.

PLATE II

Skulls of *Feresa attenuata*
Top to bottom: dorsal, lateral and ventral view.
Left: male, body length 240 cm (Specimen No. 1).
Right: female, body length 227 cm (Specimen No. 11).

PLATE III

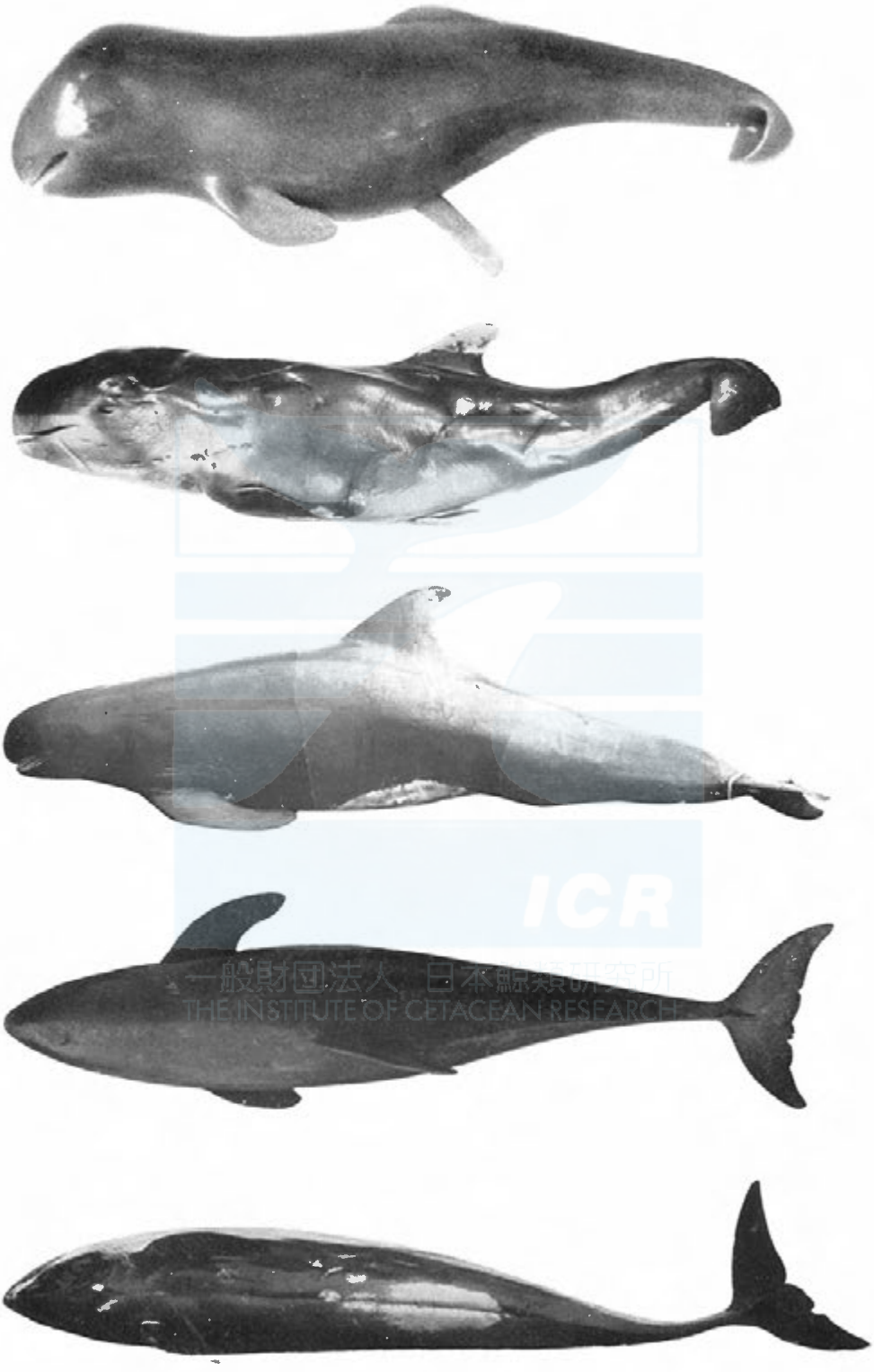
Mandible of *Feresa attenuata*
Top: male, body length 240 cm (Specimen No. 1).
Bottom: female, body length 227 cm (Specimen No. 11).

PLATE IV

Vertebrae of *Feresa attenuata*, female body length 225 cm (Specimen No. 6).
Top to bottom: cervical and dorsal, lumbar, caudal and caudal vertebrae.

PLATE V

Flipper, dorsal fin and tail flukes (top to bottom) of *Feresa attenuata*.



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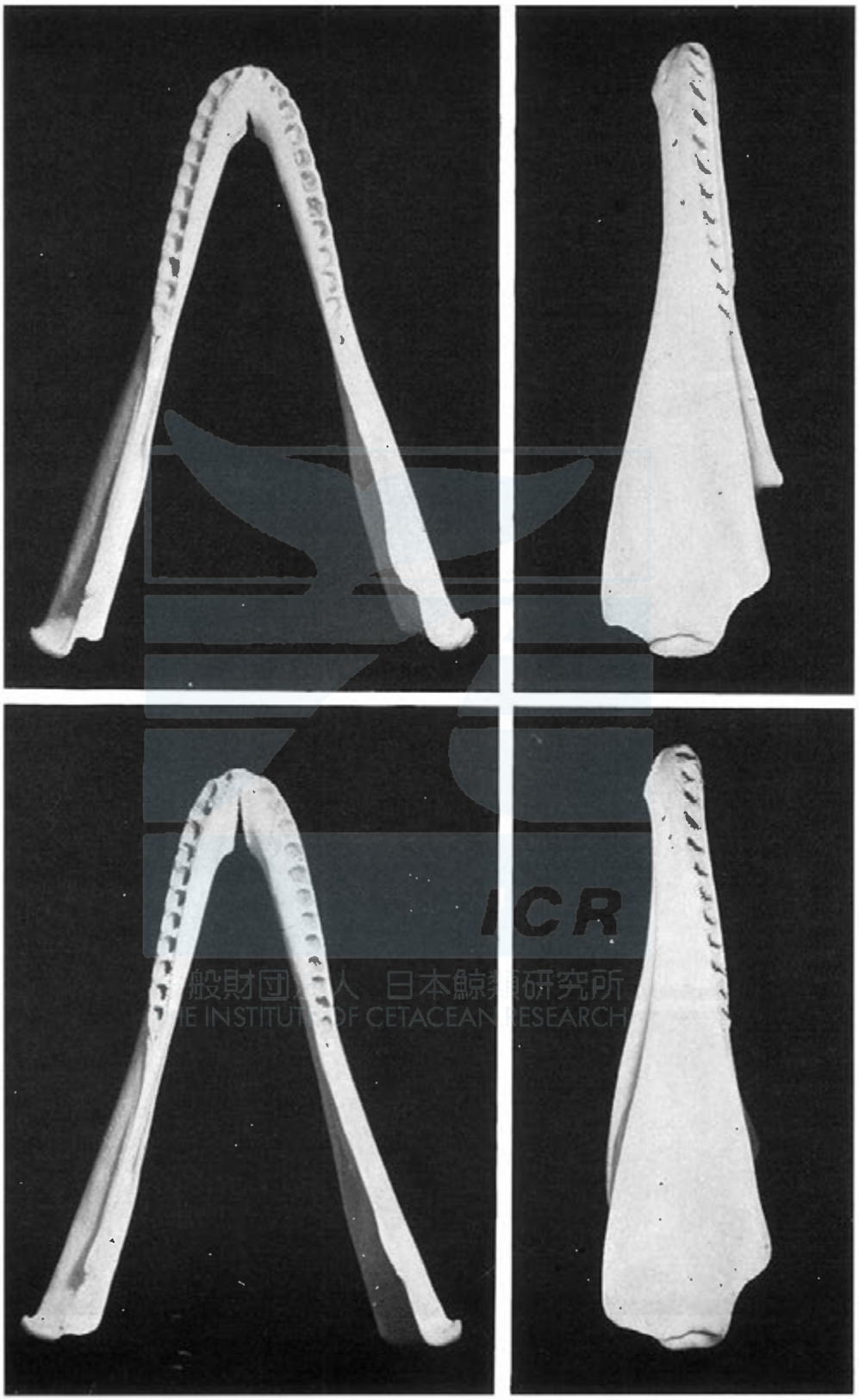

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