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[SHORT NOTE]

A record of twin fetuses of Dall's porpoise (*Phocoenoides dalli*) off the Pacific coast of Japan

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Twin fetuses of Dall's porpoise were found in a pregnant female (186 cm in body length) caught by the hand harpoon fishery off Cape Erimo, Hokkaido, on October 7, 1998. Fetuses were dizygotic twin fetuses. Two corpora lutea of their mother were 12.6 mm and 12.7 mm in mean diameter, respectively, and were about half size of those of the other 13 pregnant females having single fetus. Twin fetuses were male and female, and their body lengths were 128 mm and 142 mm, respectively. They were smaller than other fetuses obtained in the same period (average 290.5 mm, n=13) and the growth of twin fetuses seemed to be worse than single fetuses.

Key words: dizygotic twin fetuses, Dall's porpoise, growth

In Cetacea, usual litter size is one and frequency of multiplets is very low (Kimura 1957). Twin fetuses were reported in some baleen whales taken by whaling. Frequency of twins in the blue (*Balaenoptera musculus*), fin (*B. physalus*), sei (*B. borealis*) and humpback whales (*Megaptera novaeangliae*) was reported to be 0.68%, 0.93%, 1.09% and 0.39%, respectively (Paulsen 1939). Occurrence of triplets or more is rarer than that of twins (Kimura 1957). For small cetaceans, twins have been reported in the striped dolphin, *Stenella coeruleoalba*, captured at Kawana, Shizuoka Prefecture, Japan (Tobayama et al. 1970) and Dall's porpoise, *Phocoenoides dalli*, collected from eastern North Pacific (Yoshioka et al. 1987). Yoshioka et al. (1987) examined monozygotic twin fetuses of 30 mm and 33 mm in body length, respectively, which were in very early fetal stage. I obtained twins of Dall's porpoise in the later growth stage than twins reported by Yoshioka et al. (1987) from waters off the Pacific coast of Japan. Since their external measurements were able to be examined easily, I compared growth of twins with that of single fetuses, in this study.

Dall's porpoises occur in the northern North Pacific Ocean and the adjacent seas. Their southernmost distribution is about 35°N off both the east and west coasts of Japan and approximately 32°N off the west coast of Northern America (Leatherwood et al. 1982, Miyashita and Kasuya 1988), and it may invade far to the north, with the Chukchi Sea as the northern limit (Sleptsov 1961). Dall's porpoises mainly inhabit the open sea, but they are also found in deep nearshore areas, inland passages or sounds (Leatherwood et al. 1982).

Two major color morphs are known in the species, *truei*- and *dalli*-types. *Truei*-type has a larger lateral white flank patch extending as far anterior as the flipper and is distributed off the Pacific coast of northern Japan through the Kuril Islands to the central Okhotsk Sea (Kasuya 1978, 1982, Miyashita and Doroshenko 1990, Miyashita 1991). *Dalli*-type has a smaller lateral white flank patch extending to the dorsal fin level and is distributed in the northern North Pacific Ocean, Sea of Japan, Okhotsk Sea and Bering Sea (Kasuya 1978, 1982). Body length at birth of Dall's porpoise is estimated 90–100 cm (Kasuya 1978, Newby 1982, Ferrero and Walker 1999), after 11.4–12 months gestation (Kasuya 1978, Ferrero and Walker 1999). The calving season of *dalli*-type population around Japanese waters is estimated to be May to June (Amano and Kuramochi 1992).

Biological research of Dall's porpoises was conducted on the hand harpoon fishing boat (*Koyo-maru*, 17 tons) off the Pacific coast of Hokkaido, Japan, during 5 to 31 in October, 1998 (Fig. 1). In this research 76 dalli-type Dall's porpoises were examined. Thirty-two porpoises (42.1% of the total) were females and 20 (62.5%) of total females were pregnant. Twin fetuses were found in a pregnant female of 186 cm in body length, which was captured off Cape Erimo (41°50′N, 143°30′E) on October 7, 1998 (Fig. 1). The uterus having twin fetuses and ovaries were collected and frozen until laboratory examination.

In the laboratory, the uterus was incised to retrieve twin

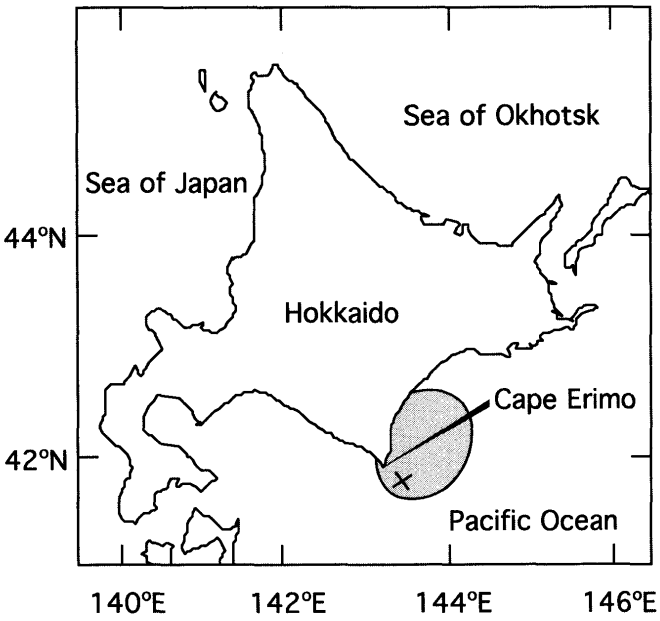

Fig. 1. Research area (gray) and catch position of mother having twin fetuses (cross).

fetuses and ovaries were examined in details. The left ovary had two corpora lutea and no corpus albicans, and right ovary had no corpora (Fig. 2). Thus, this individual was thought to be in the first pregnancy and the fetuses were dizygotic twins. Twin fetuses were male and female, and their body lengths were 128 mm and 142 mm, respectively. The two corpora lutea were 12.7 mm and 12.6 mm in mean diameter (cubic root of three dimensions), respectively, and were about half size of those of other 13 pregnant females having single fetus (mean±SD=26.3 mm±2.5, n=13).

Most of body surface of the twin was not pigmented, although appendages and dorsal median from around blowhole to flukes were dark brown (Fig. 3). Both fetuses had apparent mouth-flipper stripes and head bridle (Perrin 1997). This color pattern was similar to that of other fetuses collected during the survey. External measurements and proportions of the twin fetuses are shown in Table 1. Body lengths of twin fetuses were smaller than those of the single fetuses. In 7 of 23 relative measurements, the twin fetuses were smaller than the lowest values of single fetuses. The obvious differences were seen in head, dorsal fin, and fluke region. Particularly in flukes, most of relative measurements of twin fetuses were smaller than those of single fetuses.

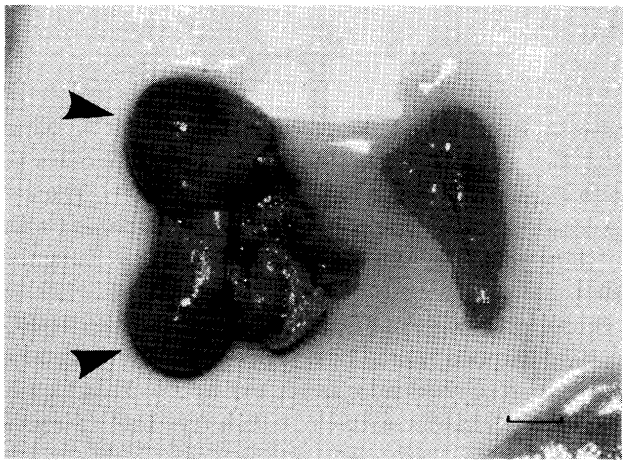

Fig. 2. Ovaries of the twin's mother. Arrows indicate corpora lutea in the left ovary and the bar indicates 1 cm.

In fetal growth of Antarctic fin whales, Ohsumi (1960) reported that fluke shapes were drastically changed with the fetal growth; at first fetuses of the species had merely conical flukes, the projection was developed on the side of tail at 8 cm length and 80 cm fetuses had almost complete flukes. Small body lengths and less developed flukes of the present twins suggest that they were in an earlier growth stage than other single fetuses. Kimura (1957) stated that the growth of multiplets was not worse than that of single fetuses in southern fin whales. In Dall's porpoise, however, the growth of twin fetuses seemed to be worse than single fetuses.

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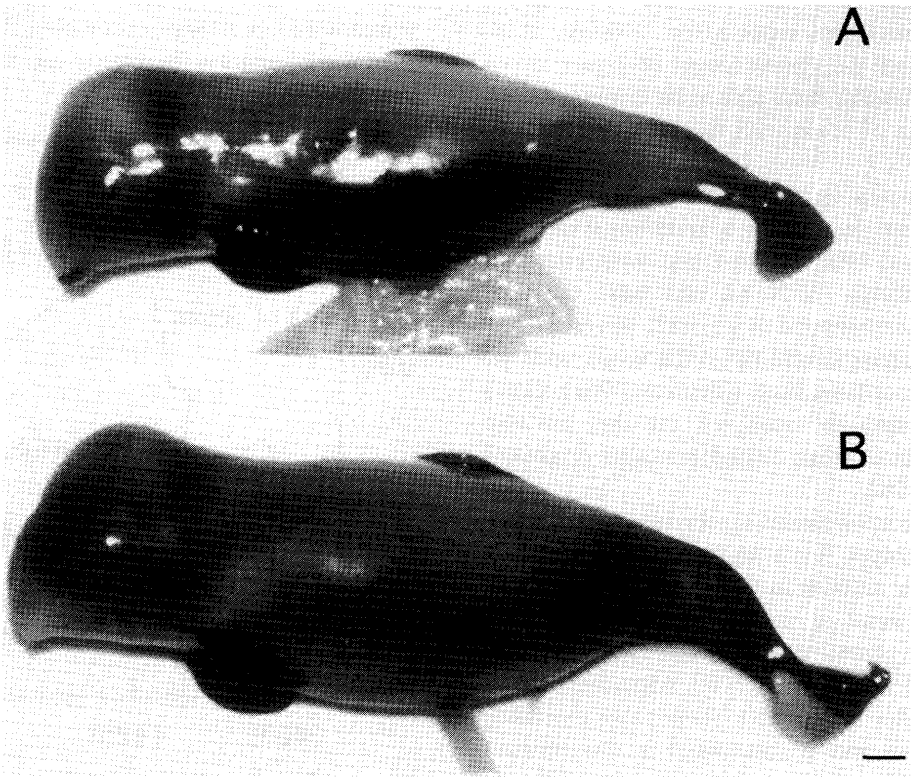

Fig. 3. Twin fetuses of Dall's porpoise. A; male, body length 128 mm. B; female, body length 142 mm. The bar indicates 1 cm.

Table 1. External measurements and relative values to body length of the twin and single fetuses of Dall's porpoise.

	Twins				Singles (n=13)			
	Male		Female		Mean		Range	
	mm	%	mm	%	mm	%	mm	%
Body length	128.0	—	142.0	—	290.5	—	240.0–390.0	—
Tip of upper jaw to angle of gape	9.0	7.0	9.3	6.5	20.9	6.6	16.0–29.0	6.3–8.3
Tip of upper jaw to blowhole	4.2	3.3	5.1	3.6	18.8	6.4	13.0–32.7	5.2–8.6*
Tip of upper jaw to center of eye	16.0	12.5	20.8	14.6	37.4	12.8	30.0–53.4	11.0–14.0
Tip of upper jaw to ear	21.6	16.9	26.8	18.9	56.5	19.3	44.1–68.9	16.8–21.7
Tip of upper jaw to flipper	21.1	16.5	28.9	20.4	62.3	21.3	46.0–79.0	18.9–23.1
Tip of upper jaw to anterior insertion of dorsal fin	54.1	42.3	59.7	42.0	132.1	45.4	107.0–157.0	35.3–49.2
Tip of upper jaw to umbilicus	63.8	49.8	72.0	50.7	143.1	49.3	112.0–185.0	46.1–52.1
Tip of upper jaw to center of genital aperture	79.4	62.0	94.5	66.5	181.2	62.1	152.0–224.0	58.5–66.7
Tip of upper jaw to anus	86.6	67.7	98.2	69.2	187.0	64.3	113.0–248.0	63.0–64.7
Angle of gape to center of eye	9.0	7.0	10.1	7.1	22.9	7.9	18.0–29.0	7.0–8.4
Center of eye to ear	4.9	3.8	6.1	4.3	18.1	6.2	14.7–24.3	5.4–8.6*
Anterior length of flipper	18.6	14.5	19.8	13.9	39.5	13.6	32.8–47.4	12.4–14.8
Posterior length of flipper	12.4	9.7	13.6	9.6	26.0	9.0	21.2–32.3	6.7–10.0
Flipper width at base	7.8	6.1	6.8	4.8	16.8	5.7	13.0–22.1	3.4–6.5
Maximum flipper width	8.0	6.3	8.7	6.1	18.4	6.3	15.3–22.0	5.7–8.8
Anterior length of dorsal fin	8.3	6.5	10.0	7.0	32.7	11.2	19.1–44.7	10.3–12.8*
Posterior length of dorsal fin	10.3	8.0	9.4	6.6	26.8	9.1	16.9–37.7	6.5–12.4
Basal length of dorsal fin	17.9	14.0	17.4	12.3	43.5	14.9	31.2–56.5	12.3–17.4
Height of dorsal fin	6.9	5.4	4.9	3.5	20.6	7.0	15.0–29.8	6.0–7.9*
Span of flukes	24.9	19.5	24.7	17.4	75.1	25.7	62.4–101.0	23.3–27.8*
Anterior length of fluke	8.7	6.8	15.4	10.8	48.1	16.4	37.7–70.6	14.7–18.5*
Posterior length of fluke	14.0	10.9	11.9	8.4	37.7	12.9	30.8–49.7	11.7–14.3*
Medial length of flukes	14.3	11.2	16.0	11.3	33.3	11.4	27.4–44.2	9.4–14.0

* Different ranges between twins and singles.

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イシイルカの双生児の記録

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1998年10月7日に北海道，襟裳岬沖で突きん棒船で捕獲された妊娠雌（体長186 cm）からイシイルカの双子の胎児が得られた．双子は二卵性双生児であった．母親の黄体の直径はそれぞれ12.6 mm, 12.7 mmであり，一生児をもつ他の13個体の母親のおよそ半分の大きさであった．双子の性別は雄と雌で，体長はそれぞれ128 mm, 142 mmであった．これら双子の胎児は同時期に捕獲された他の胎児（平均290.5 mm, n=13）よりも体長が小さく，この双子の成長は一生児の成長よりも悪いようであった．

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