Aquatic Mammals 2023, *49*(4), 356-365, DOI 10.1578/AM.49.4.2023.356

Northernmost Record of the Ginkgo-Toothed Beaked Whale (*Mesoplodon ginkgodens*)

Wojtek Bachara,[1*] Mika Kuroda,[2, 3*] Shin Nishida,[4]
Hajime Ishikawa,[3, 5] and Takashi Fritz Matsuishi[3, 6]

[1]*PO Box 555, 05-120 Legionowo, Poland*
[2]*Field Science Center for Northern Biosphere, Hokkaido University,*
2-9-1 Nanae-cho Kameda, Hokkaido 041-1105, Japan
[3]*Stranding Network Hokkaido, 3-1-1 Minato-cho Hakodate, Hokkaido 041-8611, Japan*
[4]*Faculty of Education, University of Miyazaki,*
1-1 Gakuenkibanadai–Nishi Miyazaki, Miyazaki 889-2155, Japan
[5]*Institute of Osaka Marine Research, 703-15 Moriura, Taiji, Wakayama 619-5172, Japan*
[6]*GCF, Faculty of Fisheries Sciences, Hokkaido University,*
3-1-1 Minato-cho Hakodate, Hokkaido 041-8611, Japan
E-mail: catm@fish.hokudai.ac.jp
**Co-first authors*

Abstract

The ginkgo-toothed beaked whale (*Mesoplodon ginkgodens*) is one of the least-known cetaceans in the world, with a formerly recognised distribution that included temperate, subtropical, and tropical waters in the North and South Pacific and Indian Oceans. We report an additional specimen of this species, which also represents the northernmost-known specimen—an adult male found dead, stranded on the coast of Hokkaido, northernmost Japan.

Key Words: distribution, stranding, Hokkaido, Japan, ginkgo-toothed beaked whale, *Mesoplodon ginkgodens*

Introduction

The ginkgo-toothed beaked whale (*Mesoplodon ginkgodens*) was described from an adult male that had stranded on 22 September 1957 at Oiso Beach (35.3° N, 139.3° E), Kanagawa, Japan (Nishiwaki & Kamiya, 1958). This whale takes its name from the shape of the male's teeth, which resemble those of the leaf of the ginkgo tree (*Ginkgo biloba*). At about 10 cm in width, these paired teeth are the widest known for any beaked whale species, occur on the lower jaw towards the middle of the beak, and erupt only in mature males (Mead, 1989).

To date, 95 individuals of this species from 88 separate stranding events have been identified (Wojtek Bachara, unpub. stranding database). The data have been collected from Japan, southern China, Taiwan, the Philippines, and New Zealand. Because of the condition of the usage of data, the raw data cannot be disclosed, but the co-authors confirmed that all records are reliable.

In Japan, 30 stranding events have been reported between 1935 and 2021, involving 31 individual whales for this species (Ishikawa et al., 2013, 2014, 2015, 2016, 2017, 2018, 2019; Ishikawa, 2021; Table 1). Among these, RO-18 (Table 1) was discovered before the description of this species, and its skull was preserved at the National Museum of Nature and Science Tokyo as an unidentified *Mesoplodon* sp. Subsequently, it was reappraised in 1998 and confirmed to be that of a ginkgo-toothed beaked whale.

Herein, we report an additional specimen from waters off Hokkaido: a 477-cm adult male from Yakumo, southern Hokkaido, reported on 4 February 2022. It represents the 31st stranding event and 32nd individual in Japan, as well as the most northernmost known record of this species.

Methods

Study Site and Data Collection

The Stranding Network Hokkaido (2022), a nonprofit organisation that has researched stranded cetaceans on Hokkaido since 2007, was first notified of this specimen that was found stranded on the coast of Otoshibe, Yakumo, Hokkaido, Japan (42.19252° N, 140.42824° E) at around 0845 h on 4 February 2022 (Figure 1). A fisher walking along the beach found a dead individual floating in the surf. He informed the Yakumo Town Office via the Otoshibe Fishery

Table 1. Reported strandings of ginkgo-toothed beaked whales (*Mesoplodon ginkgodens*) from Japan. BL = body length (m); U = unknown.

No.	Date	BL	Sex	Condition	Prefecture	Source
RO-018	6 Jan. 1935	U	U	U	Miyazaki	Ishikawa et al., 2013
RO-017	22 Sept. 1957	4.72	M	U	Kanagawa	Ishikawa et al., 2013
RO-021	13 March 1968	U	U	U	Chiba	Ishikawa et al., 2013
RO-019	23 Aug. 1968	4.70	M	Strand	Kanagawa	Ishikawa et al., 2013
RO-020	28 July 1971	4.77	M	U	Shizuoka	Ishikawa et al., 2013
RO-249	19 Sept. 1974	4.95	M	Strand	Chiba	Ishikawa et al., 2013
RO-309	20 July 1982	U	M	Strand	Okinawa	Ishikawa et al., 2013
RO-067	3 Aug. 1982	5.28	F	Strand	Chiba	Ishikawa et al., 2013
DO-188	21 July 1987	4.75	U	Stray	Okinawa	Ishikawa et al., 2013
O-094	3 Sept. 1989	4.80	F	Bycatch	Shizuoka	Ishikawa et al., 2013
O-137	23 March 1991	4.87	F	Strand	Kanagawa	Ishikawa et al., 2013
O-283	2 Dec. 1994	5.10	M	Strand	Chiba	Ishikawa et al., 2013
O-949	8 March 2001	3.12	F	Strand	Kanagawa	Ishikawa et al., 2013
O-1131	20 March 2002	4.94	F	Strand	Ibaraki	Ishikawa et al., 2013
O-2426	10 Aug. 2008	4.675	M	Strand	Shizuoka	Ishikawa et al., 2013
O-2491	Aug. 2008	4.10	M	Strand	Okinawa	Ishikawa et al., 2013
O-2971	9 Sept. 2010	4.70	U	Strand	Kagoshima	Ishikawa et al., 2013
O-3458	1 Nov. 2011	4.90	F	Strand	Miyazaki	Ishikawa et al., 2013
O-3712	5 Sept. 2012	4.70	M	Strand	Tokushima	Ishikawa et al., 2013
O-3789	17 Nov. 2012	4.46	M	Strand	Kumamoto	Ishikawa et al., 2013
O-4303	22 Nov. 2014	5.15	F	Strand	Tokyo	Ishikawa et al., 2015
O-5035	30 Sept. 2016	5.10	F	Strand	Nagasaki	Ishikawa et al., 2017
O-4825	16 Oct. 2016	4.60	M	Strand	Shizuoka	Ishikawa et al., 2017
O-6059	7 Aug. 2017	4.47 4.56	M F	Strand	Kagoshima	Ishikawa et al., 2018*
O-5309	24 May 2018	4.65	F	Strand	Kagoshima	Ishikawa et al., 2019
O-6070	4 June 2018	4.80	U	Strand	Kagoshima	Ishikawa et al., 2019
O-5342	17 July 2018	4.58	M	Strand	Shizuoka	Ishikawa et al., 2019
O-5550	30 May 2019	U	M	Strand	Chiba	Ishikawa et al., 2019
O-6336	16 Aug. 2021	4.8	F	Strand	Chiba	Ishikawa, 2021
DO-466	22 March 2021	5.19	M	Strand	Ibaraki	Ishikawa, 2022

*Identified by the author (WB) from photos. Molecular (DNA) confirmation not conducted.

Cooperative Association, and, at 1024 h, the Stranding Network Hokkaido was notified (Occurrence ID: SNH22005). The whale was recovered at 1300 h and then was delivered to the Hakodate Research Centre for Fisheries and Oceans at 1500 h (Figure 2) where external measurements and photographs were taken immediately. A necropsy was performed on 5 February 2022. Muscle tissue was collected for genetic analysis.

Figure 1. The ginkgo-toothed beaked whale (*Mesoplodon ginkgodens*) when first discovered, 4 February 2022 (Photo courtesy of Yakumo Town staff)

Figure 2. Left side full-body photo of the specimen reported in this study, 4 February 2022 (Photo provided by authors)

Genetic Analysis

A 15 mg of muscle sample was placed in a 1.5 mL microcentrifuge tube containing 180 µL of ATL buffer and 20 µL of proteinase K (20 mg/mL). After incubating overnight at 56°C, total genomic DNA was extracted using a DNeasy Blood & Tissue Kit (QIAGEN, Hilden, Germany) following manufacturer instructions.

The mitochondrial (mt) DNA control region was amplified using PCR primers CRL (5'-CAACACCCAAAGCTGGAATTCT-3'; Kitamura et al., 2013) and CRH2 (5'-TAGACATTTTCAGTGTCTTGC-3'; Yamada et al., 2019). PCR consisted of 20 µL reactions containing 0.5 µL of total DNA, 1 × PCR buffer, 0.2 mM dNTP mixture, 0.2 µM of each primer, and 0.375 units *TaKaRa Ex Taq* (TaKaRa Bio, Kusatsu, Shiga, Japan). PCR involved pre-cycling at 94°C for 5 min, followed by 35 cycles of 30 s at 94°C, 45 s at 54°C, 45 s at 72°C, and 72°C for 10 min as a post-extension. PCR products were purified by NucleoSpin Gel and PCR Clean-up (Macherey-Nagel, Allentown, PA, USA), and then sequenced using an Applied Biosystems 3130 (Thermo Fisher Scientific, Waltham, MA, USA) with Big Dye Terminator, Version 3.1, Cycle Sequencing Kit (Thermo Fisher Scientific) at Frontier Science Research Center, University of Miyazaki. Primer CRH (5'-CCATCGAGA TGTCTTATTTAAG-3'; Kitamura et al., 2013) was also used as an internal sequencing primer.

Alignment of sequence data and phylogenetic analysis were performed using *MEGA7* (Kumar et al., 2016) and *MEGA11* (Tamura et al., 2021). A sequence similarity search was conducted by *BLAST* (Altschul et al., 1990) using the National Center for Biotechnology Information with INSD (International Nucleotide Sequence Database). A neighbour-joining (NJ) tree (Saitou & Nei, 1987) was constructed with genetic distances using the Tamura and Nei method (Tamura & Nei, 1993) and 424 bp of mtDNA control region sequences. Reference sequences of *Mesoplodon* spp. and *Ziphius cavirostris* (KC776696) from the INSD were used as outgroups (Table 2). Bootstrap analysis (Felsenstein, 1985) was performed using 1,000 replicates.

Results

External Appearance

The body length of the initially unidentified cadaver was 477 cm, and it was at a Code 3 (early) stage of decomposition. Dorsal body surfaces had numerous cookiecutter shark (*Isistius brasiliensis*) bites. Consistent with the description of Kim et al. (2019) for the ginkgo-toothed beaked whale, the body was dark grey, excepting the white beak; the ventral head surface had a pair of v-shaped grooves; the small dorsal fin was hooked and its tip positioned at a distance of 67% of the body length from the beak tip; the beak was short and stout; the melon had a slight bulge, sloping fairly steeply from the beak; and the mouthline curved sharply upward about midway from the tip to a single pair of

Table 2. Beaked whale reference molecular sequences used in this study

Species	INSD no.	Source
Mesoplodon bidens	AY579507	Dalebout et al., 2004
Mesoplodon bowdoini	AY579509	Dalebout et al., 2004
M. bowdoini	AY579510	Dalebout et al., 2004
M. bowdoini	HQ400629	Otley et al., 2012
Mesoplodon carlhubbsi	AB572009	Kitamura et al., 2013
M. carlhubbsi	AB572010	Kitamura et al., 2013
M. carlhubbsi	AY579511	Dalebout et al., 2004
Mesoplodon densirostris	AB610396	Kitamura et al., 2013
M. densirostris	KF032860	Morin et al., 2012
M. densirostris	KF032862	Morin et al., 2012
M. densirostris	KF032872	Morin et al., 2012
M. densirostris	KF032873	Morin et al., 2012
Mesoplodon eueu	OK326893	Carroll et al., 2021
Mesoplodon europaeus	AY579516	Dalebout et al., 2004

M. europaeus	KC776691	Morin et al., 2012
M. europaeus	KC776694	Morin et al., 2012
Mesoplodon ginkgodens	AY579517	Dalebout et al., 2004
M. ginkgodens	AY579518	Dalebout et al., 2004
M. ginkgodens	KF027302	Dalebout et al., 2014
M. ginkgodens	KF027303	Dalebout et al., 2014
M. ginkgodens	KF027304	Dalebout et al., 2014
M. ginkgodens	KF027305	Dalebout et al., 2014
M. ginkgodens	KR534596	Yao et al., 2016
M. ginkgodens	MH019963	Kim et al., 2019
Mesoplodon grayi	KJ767597	Thompson et al., 2015 (direct submission)
M. grayi	KJ767600	Thompson et al., 2015 (direct submission)
M. grayi	KJ767618	Thompson et al., 2015 (direct submission)
M. grayi	KJ767621	Thompson et al., 2015 (direct submission)
Mesoplodon hectori	AY028313	Gales et al., 2002
M. hectori	AY228108	Cappozzo et al., 2005
M. hectori	AY579521	Dalebout et al., 2004
Mesoplodon hotaula	JX470545	Dalebout et al., 2007
M. hotaula	KF027298	Dalebout et al., 2014
M. hotaula	KF027300	Dalebout et al., 2014
Mesoplodon layardii	AY579523	Dalebout et al., 2004
M. layardii	HQ400639	Otley et al., 2012
M. layardii	HQ400642	Otley et al., 2012
Mesoplodon mirus	AY579525	Dalebout et al., 2004
M. mirus	U70465	Henshaw et al., 1997
Mesoplodon perrini	AF441258	van Helden et al., 2002
Mesoplodon peruvianus	AF492413	van Helden et al., 2002
M. peruvianus	AY579526	Dalebout et al., 2004
Mesoplodon stejnegeri	AB610399	Kitamura et al., 2013
M. stejnegeri	AY579527	Dalebout et al., 2004
M. stejnegeri	AY579528	Dalebout et al., 2004
Mesoplodon traversii	AF439992	van Helden et al., 2002
M. traversii	JX901028	Thompson et al., 2012
Indopacetus pacificus	LC584181	Kobayashi et al., 2021
Ziphius cavirostris	KC776696	Morin et al., 2012

small teeth (Figure 3). External measurements are defined in Table S1 and reported in Figure 4 (the supplementary table for this article can be found on the *Aquatic Mammals* website). Because moving the whale was difficult, body circumference (measurements 19 to 24; Figure 4) was calculated by doubling values for the left side of the body.

Genetic Analysis

An 892 bp sequence was obtained, including the full 870 bp length of the mtDNA control region. A *BLAST* search for this sequence revealed a close match (99.1%) with sequences of *M. ginkgodens* (from Taiwan: KR534596; Yao et al., 2016). Additionally, this individual had an identical sequence to the holotype of

Figure 3. Head of ginkgo-toothed beaked whale, with white rostral tip and paired protruding teeth, 4 February 2022 (Photo provided by authors)

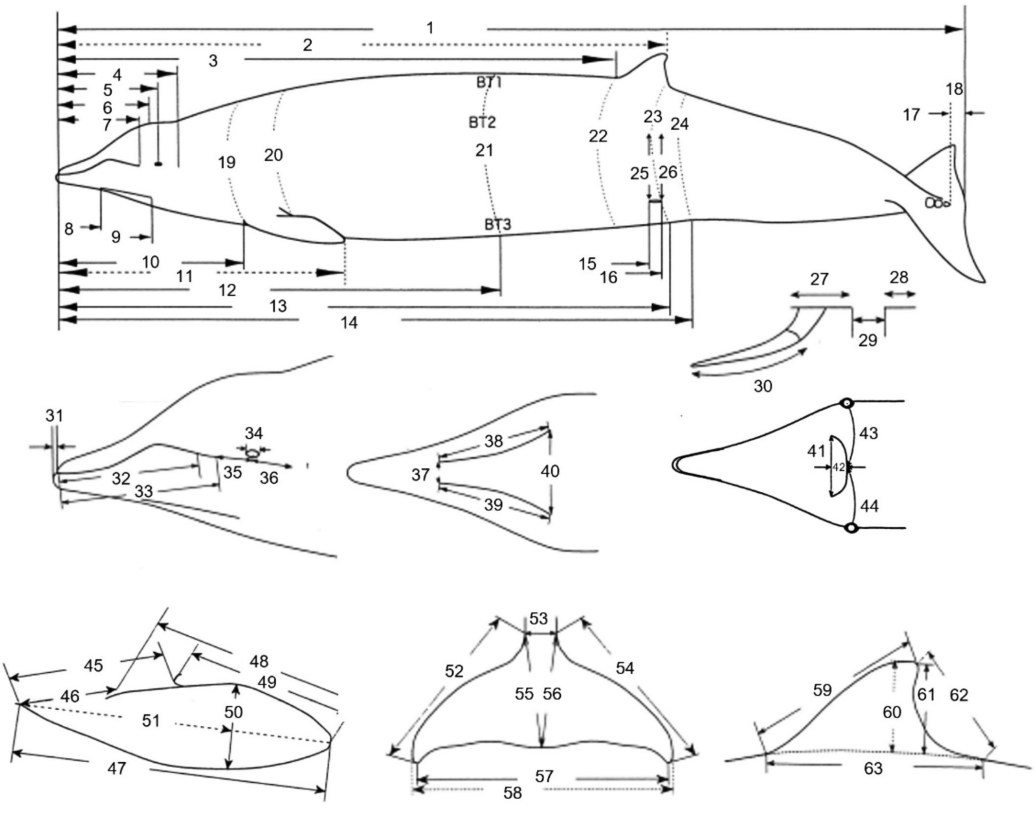
M. ginkgodens for which only a short sequence of 223 bp is available (from Kanagawa, Japan: AY579518; Dalebout et al., 2004). In the NJ tree (Figure 5), the specimen was positioned in the monophyletic *M. ginkgodens* clade with high bootstrap values, and with an identical sequence to an individual from Jeju Island, Korea (Kim et al., 2019).

Discussion

From the results, the distribution of this species is considered to be wider than previously indicated. Subsequent to its original description by Nishiwaki & Kamiya (1958) from Japan, this species has been reported widely. Moore & Gilmore (1965) reported an adult female washed ashore in San Diego County, California. A skull found in Malaysia in 1954 was attributed to this species by Mead (1989). Two females originally identified as Andrews' beaked whales (Tidemann, 1980) from New South Wales, Australia, were subsequently reidentified as ginkgo-toothed beaked whales (Mead, 1989); Dixon & Frigo (1994) also attributed a skull found in Victoria, Australia, to this species. A juvenile male found at Genovesa Island, Galápagos Islands, in 1970 (Palacios, 1996); a 208-cm female calf presumed to be this species from Thailand (Chantrapornsyl et al., 1996); a male tooth found before 1978 in the Maldives (Anderson et al., 1999); and two males stranded in New Zealand (Dalebout et al., 2014) have also all been attributed to this species. Three tropical records include one from the Federated States of Micronesia (Dalebout et al., 2008) and two from the Marshall Islands (Smithsonian Database, 30 April 2022; http://collections.nmnh.si.edu/search/mammals). An adult male was stranded in 2008 on Fujian, China (Wang et al., 2015), and a mother–calf pair was stranded in 2013 on Jeju Island, South Korea (Kim et al., 2019).

Hitherto unpublished, further recent records include three additional strandings in New South Wales, Australia (S. Lorigan, pers. comm., 1 March 2022); two dead adults on Bartolomé Island, Galápagos Islands, in 2006 that were reported by Galápagos National Park personnel and the Charles Darwin Foundation (D. M. Palacios, pers. comm., 13 February 2022); and one live stranding in Mexico in 2021 (J. Urban, pers. comm., 22 February 2022).

All earlier records of this species are from temperate, subtropical, and tropical waters. The male that we report represents the first record of this species from the continental climate zone.



No.	length (cm)
1	477.0
2	318.1
3	286.6
4	65.1
5	52.6
6	44.7
7	35.1
8	20.3
9	43.3
10	91.0
11	147.2
12	213.0
13	314.1
14	345.8
15	332.8
16	340.6
17	N/A
18	N/A

No.	length (cm)
19	210.0
20	246.8
21	277.2
22	238.2
23	103.4
24	177.2
25	26.0
26	24.0
27	N/A
28	N/A
29	N/A
30	N/A
31	0.4
32	33.1
33	4.38
34	3.0
35	17.1
36	N/A

No.	length (cm)
37	2.5
38	26.6
39	26.4
40	25.0
41	12.0
42	4.9
43	33.5
44	30.3
45	26.4
46	12.4
47	30.8
48	39.6
49	32.0
50	15.0
51	32.3
52	69.8
53	13.8
54	70.1

No.	length (cm)
55	40.0
56	40.7
57	115.2
58	117.1
59	20.3
60	16.9
61	16.4
62	15.5
63	23.5
Blubber thickness	
(blubber+epidermis)	
BT1	5.8+0.1
BT2	4.1+0.1
BT3	5.2+0.1

Figure 4. Ginkgo-toothed beaked whale measures (1 to 63; BT1 to 3) and measurements

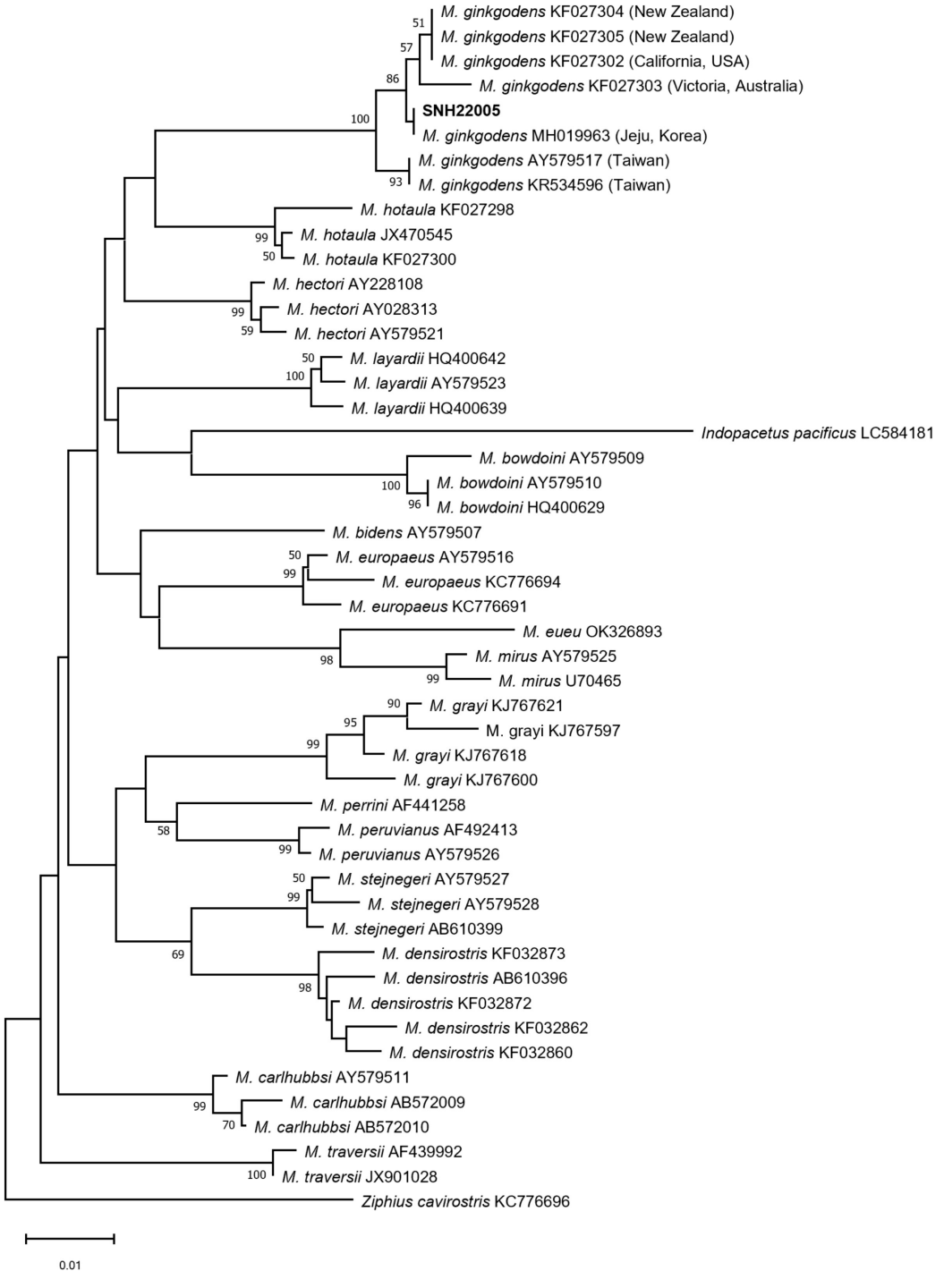


Figure 5. NJ tree of *Mesoplodon* spp. with SNH22005 using 424 bp of the mtDNA control region. Bootstrap values (1,000 replicates) > 50% are shown next to branches. *Ziphius cavirostris* is used as an outgroup. The INSD Accession No. is shown after the scientific name.

On 29 November 2021, an additional adult male, presumably this species, stranded in Date, Hokkaido (Stranding Network Hokkaido, 2022). Species identification was not confirmed because we lost site of it with bad weather, but multiple *M. ginkgodens* may have migrated near Hokkaido during the winter. The most recent records from northernmost Japanese waters suggest that our current understanding of the distribution of this species is incomplete and that its range can extend into cold North Pacific waters.

Note: A supplemental table for this article is available in the "Supplemental Material" section of the *Aquatic Mammals* website: https://www.aquaticmammalsjournal.org/index.php?option=com_content&view=article&id=10&Itemid=147.

Acknowledgments

We thank Shona Lorigan, Dr. Daniel Palacios, Dr. Jorge Urban, and the Taiwan Cetacean Society for unpublished records of this species. We also thank Dr. Steve O'Shea of Edanz (https://jp.edanz.com/ac) for editing a draft of this manuscript.

Literature Cited

Altschul, S. F., Gish, W., Miller, W., Myers, E. W., & Lipman, D. J. (1990). Basic local alignment search tool. *Journal of Molecular Biology*, *215*(3), 403-410. https://doi.org/10.1016/S0022-2836(05)80360-2

Anderson, R. C., Shaan, A., & Waheed, Z. (1999). Records of cetacean "strandings" from the Maldives. *Journal of South Asian Natural History*, *4*(2), 187-202.

Cappozzo, H. L., Negri, M. F., Mahler, B., Lia, V. V., Martinez, P., Gianggiobe, A., & Saubidet, A. (2005). Biological data on two Hector's beaked whales, *Mesoplodon hectori*, stranded in Buenos Aires province, Argentina. *Latin American Journal of Aquatic Mammals*, *4*(2), 113-128. https://doi.org/10.5597/lajam00076

Carroll, E. L., McGowen, M. R., McCarthy, M. L., Marx, F. G., Aguilar, N., Dalebout, M. L., Dreyer, S., Gaggiotti, O. E., Hansen, S. S., van Helden, A., Onoufrou, A. B., Baird, R. W., Baker, C. S., Berrow, S., Cholewiak, D., Claridge, D., Constantine, R., Davison, N. J., Eira, C., Fordyce, R. E., . . . Olsen, M. T. (2021). Speciation in the deep: Genomics and morphology reveal a new species of beaked whale *Mesoplodon eueu*. *Proceedings of the Royal Society B: Biological Sciences*, *288*(1961), 20211213. https://doi.org/10.1098/rspb.2021.1213

Chantrapornsyl, S., Adulyanukosol, K., & Kittiwathanawong, K. (1996). Records of cetaceans in Thailand. *Phuket Marine Biological Center Research Bulletin (Thailand)*, *61*, 39-63.

Dalebout, M. L., Robertson, K. M., Chivers, S. J., & Samuels, A. (2008). DNA identification and the impact of illegal, unregulated, and unreported (IUU) fishing on rare whales in Micronesian waters. *Micronesica*, *40*(1/2), 139-147.

Dalebout, M. L., Baker, C. S., Mead, J. G., Cockcroft, V. G., & Yamada, T. K. (2004). A comprehensive and validated molecular taxonomy of beaked whales, family Ziphiidae. *Journal of Heredity*, *95*(6), 459-473. https://doi.org/10.1093/jhered/esh054

Dalebout, M. L., Baker, C. S., Steel, D., Robertson, K. M., Chivers, S. J., Perrin, W. F., Mead, J. G., Grace, R. V., & Schofield, T. D., Jr. (2007). A divergent mtDNA lineage among *Mesoplodon* beaked whales: Molecular evidence for a new species in the tropical Pacific? *Marine Mammal Science*, *23*(4), 954-966. https://doi.org/10.1111/j.1748-7692.2007.00143.x

Dalebout, M. L., Baker, C. S., Steel, D., Thompson, K., Robertson, K. M., Chivers, S. J., Perrin, W. F., Goonatilake, M., Anderson, R. C., Mead, J. G., Potter, C. W., Thompson, L., Jupiter, D., & Yamada, T. K. (2014). Resurrection of *Mesoplodon hotaula* Deraniyagala 1963: A new species of beaked whale in the tropical Indo-Pacific. *Marine Mammal Science*, *30*(3), 1081-1108. https://doi.org/10.1111/mms.12113

Dixon, J. M., & Frigo, L. (1994). *The cetacean collection of the Museum of Victoria: An annotated catalogue*. Australian Deer Foundation, Victoria.

Felsenstein, J. (1985). Confidence limits on phylogenies: An approach using the bootstrap. *Evolution*, *39*(4), 783-791. https://doi.org/10.1111/j.1558-5646.1985.tb00420.x

Gales, N. J., Dalebout, M. L., & Bannister, J. L. (2002). Genetic identification and biological observation of two free-swimming beaked whales: Hector's beaked whale (*Mesoplodon hectori*, Gray, 1871), and Gray's beaked whale (*Mesoplodon grayi*, von Haast, 1876). *Marine Mammal Science*, *18*(2), 544-551. https://doi.org/10.1111/j.1748-7692.2002.tb01055.x

Henshaw, M. D., LeDuc, R. G., Chivers, S. J., & Dizon, A. E. (1997). Identification of beaked whales (family Ziphiidae) using mtDNA sequences. *Marine Mammal Science*, *13*(3), 487-495. https://doi.org/10.1111/j.1748-7692.1997.tb00656.x

Ishikawa, H. (2021). Stranding record in Japan (Collected in 2020). *Japan Cetology*, *31*, 15-46. https://doi.org/10.5181/cetology.0.31_15

Ishikawa, H. (2022, In press). Stranding record in Japan (Collected in 2021). *Japan Cetology*, *32*.

Ishikawa, H., Goto, M., & Mogoe, T. (2013). Stranding record in Japan 1901-2012. *Shimonoseki Marine Science Report*, *1*, 1-314. (In Japanese)

Ishikawa, H., Goto, M., & Mogoe, T. (2014). Stranding record in Japan (Collected in 2013). *Shimonoseki Marine Science Report*, *2*, 21-43. (In Japanese)

Ishikawa, H., Goto, M., & Mogoe, T. (2015). Stranding record in Japan (Collected in 2014). *Shimonoseki Marine Science Report*, *3*, 28-49. (In Japanese)

Ishikawa, H., Goto, M., & Mogoe, T. (2016). Stranding record in Japan (Collected in 2015). *Shimonoseki Marine Science Report*, *4*, 38-62. (In Japanese)

Ishikawa, H., Goto, M., & Mogoe, T. (2017). Stranding record in Japan (Collected in 2016). *Shimonoseki Marine Science Report*, *5*, 37-58. (In Japanese)

Ishikawa, H., Goto, M., & Mogoe, T. (2018). Stranding record in Japan (Collected in 2017). *Shimonoseki Marine Science Report*, *6*, 50-75. (In Japanese)

Ishikawa, H., Goto, M., & Mogoe, T. (2019). Stranding record in Japan (Collected in 2018-19). *Shimonoseki Marine Science Report*, *7*, 27-68. (In Japanese)

Kim, S., Eo, K., Oh, J., Lee, Y., Yoo, M., Kitamura, S., Tajima, Y., Yamada, T., Kim, B. Y., Youn, H. J., & Kimura, J. (2019). First record of ginkgo-toothed beaked whale (*Mesoplodon ginkgodens*) stranded in Korea. *Journal of Veterinary Medical Science*, *81*(8), 1223-1228. https://doi.org/10.1292/jvms.19-0001

Kitamura, S., Matsuishi, T., Yamada, T. K., Tajima, Y., Ishikawa, H., Tanabe, S., Nakagawa, H., Uni, Y., & Abe, S. (2013). Two genetically distinct stocks in Baird's beaked whale (Cetacea: Ziphiidae). *Marine Mammal Science*, *29*(4), 755-766. https://doi.org/10.1111/j.1748-7692.2012.00607.x

Kobayashi, N., Ozawa, S., Hanahara, N., Tokutake, K., Kaneshi, T., Inoue, K., Okabe, H., Miyamoto, K., & Ueda, K. (2021). The first record of a Longman's beaked whale (*Indopacetus pacificus*) newborn neonate found on Miyako Island, Okinawa, Japan. *Marine Biodiversity Records*, *14*, 4. https://doi.org/10.1186/s41200-021-00201-z

Kumar, S., Stecher, G., & Tamura, K. (2016). *MEGA7*: Molecular Evolutionary Genetics Analysis Version 7.0 for bigger datasets. *Molecular Biology and Evolution*, *33*(7), 1870-1874. https://doi.org/10.1093/molbev/msw054

Mead, J. G. (1989). Beaked whales of the genus *Mesoplodon*. In S. H. Ridgway & R. Harrison (Eds.), *Handbook of marine mammals: Vol. 4. River dolphins and the larger toothed whales* (pp. 349-430). Academic Press.

Moore, J. C., & Gilmore, R. M. (1965). A beaked whale new to the Western Hemisphere. *Nature*, *205*(4977), 1239-1240. https://doi.org/10.1038/2051239a0

Morin, P. A., Duchene, S., Lee, N., Durban, J., & Claridge, D. (2012). *Preliminary analysis of mitochondrial genome phylogeography of Blainville's, Cuvier's and Gervais' beaked whales* (No. SC/64/SM14). Report to the Scientific Committee of the International Whaling Commission.

Nishiwaki, M., & Kamiya, T. (1958). A beaked whale *Mesoplodon* stranded at Oiso Beach, Japan. *The Scientific Reports of the Whales Research Institute*, *13*, 53-83.

Otley, H., Smith, J., & Dalebout, M. L. (2012). Beaked whale strandings on the Falkland Islands and South Georgia, South Atlantic Ocean, between 1866 and 2008. *Journal of the Marine Biological Association of the United Kingdom*, *92*(8), 1851-1864. https://doi.org/10.1017/S0025315411000749

Palacios, D. M. (1996). On the specimen of the ginkgo-toothed beaked whale, *Mesoplodon ginkgodens*, from the Galapagos Islands. *Marine Mammal Science*, *12*(3), 444-446. https://doi.org/10.1111/j.1748-7692.1996.tb00596.x

Saitou, N., & Nei, M. (1987). The neighbor-joining method: A new method for reconstructing phylogenetic trees. *Molecular Biology and Evolution*, *4*(4), 406-425. https://doi.org/10.1093/oxfordjournals.molbev.a040454

Stranding Network Hokkaido. (2022). *Cetacean stranding data in Hokkaido* (Sampling event dataset). National Institute of Genetics, ROIS. https://www.gbif.org/occurrence/3749312345; https://doi.org/10.15468/f9y3xd

Tamura, K., & Nei, M. (1993). Estimation of the number of nucleotide substitutions in the control region of mitochondrial DNA in humans and chimpanzees. *Molecular Biology and Evolution*, *10*(3), 512-526. https://doi.org/10.1093/oxfordjournals.molbev.a040023

Tamura, K., Stecher, G., & Kumar, S. (2021). *MEGA11*: Molecular Evolutionary Genetics Analysis Version 11. *Molecular Biology and Evolution*, *38*(7), 3022-3027. https://doi.org/10.1093/molbev/msab120

Thompson, K. F., Patel, S., Baker, C. S., Constantine, R., & Millar, C. D. (2015). Mesoplodon grayi *haplotype* O_2 *control region, partial sequence; mitochondrial*. Direct submission to INSD.

Thompson, K., Baker, C. S., van Helden, A., Patel, S., Millar, C., & Constantine, R. (2012). The world's rarest whale. *Current Biology*, *22*(21), R905-R906. https://doi.org/10.1016/j.cub.2012.08.055

Tidemann, C. R. (1980). *Mesoplodon bowdoini* Andrews (Ziphiidae): A new whale record from New South Wales. *The Victorian Naturalist*, *97*, 64-65.

van Helden, A. L., Baker, A. N., Dalebout, M. L., Reyes, J. C., Van Waerebeek, K., & Baker, C. S. (2002). Resurrection of *Mesoplodon traversii* (Gray, 1874), senior synonym of *M. bahamondi* Reyes, Van Waerebeek, Cárdenas and Yañez, 1995 (Cetacea: Ziphiidae). *Marine Mammal Science*, *18*(3), 609-621. https://doi.org/10.1111/j.1748-7692.2002.tb01062.x

Wang, P., Yao, Q., Han, J., Ma, Z., & Liu, Z. (2015). Using mtDNA sequences and morphological characters to re-identify stranded beaked whales in Fujian Province, China. *Acta Theriologica Sinica*, *35*(2), 211-223.

Yamada, T. K., Kitamura, S., Abe, S., Tajima, Y., Matsuda, A., Mead, J. G., & Matsuishi, T. F. (2019). Description of a new species of beaked whale (*Berardius*) found in the North Pacific. *Scientific Reports*, *9*, 12723. https://doi.org/10.1038/s41598-019-46703-w

Yao, C., Chen, C., & Hsiao, C. (2016). The complete mitogenome of ginkgo-toothed beaked whale (*Mesoplodon ginkgodens*) (Chordata: Ziphiidae). *Mitochondrial DNA Part A*, *27*(4), 2846-2847. https://doi.org/10.3109/19401736.2015.1053122