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Additional materials of *Metasqualodon symmetricus* (Cetacea: Mammalia) from the Oligocene Ashiya Group, Japan

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Abstract A lower jaw of a squalodontid, *Metasqualodon symmetricus* OKAZAKI is recorded as the first material of that part of the species. It shows the short rostrum of the cranial proportion. Futhermore, two isolated teeth of the same species are described. These additional materials have been discovered from the Oligocene Ashiya Group of North Kyushu and adjacent area.

Introduction

In 1982, OKAZAKI proposed a new species, *Metasqualodon symmetricus* from the Ashiya Group, North Kyushu, based on a partly-preserved upper rostrum of the right side. This holotype specimen bears three cheek teeth and they show accessory cusps on either anterior and posterior cutting edges. Arrangement and shape of accessory cusps are similar to the Australian species, *Metasqualodon harwoodi* (redescribed by PLEDGE and ROTHOUSEN, 1977), but their directions are rather divergent in the Japanese species. In the present report, a lower jaw and two isolated teeth of *Metasqualodon symmetricus* is recorded from North Kyushu and Yamaguchi Prefecture, Southwest Japan. These have been found from the Ashiya Group, especially equivallent horizon of the Waita Formation, uppermost formation of the Ashiya Group. The geological age of the Ashiya Group is estimated as Oligocene in the recent studies on the micropaleontology (SAITO and OKADA, 1984, etc.). This estimation is rather concordant with that of fossil fauna of mammals and other vertebrates from the group (Table 1.).

The auther expresses his sincere thanks to Messrs. Toshiyuki KAMEI and Masahiro SATO, for they kindly offerred spcimens to study, and the members of Kitakyushu Natural History Society who helped field activities especially in the Katashima Island; Also, Dr. Yoshikazu HASEGAWA, Yokohama National University and the persons of the Kitakyushu Museum of Natural History, for their suggestions and encouragements during the study.

Table 1. Fossil List of the Ashiya Group (1987. 8.)

	Wakamatsu	Ainoshima Isl.	Umashima Isl.	Hikoshima Isl.	unknown
Mammals					
Dugongidae, gen. et sp. indet.	*				
Metasqualodon symmericus OKAZAKI (1982)	*		*	*	
squalodontid, gen. et spp. indet.	*	*	*	*	
Patriocetus ? sp. (MATSUMOTO 1923), etc.	*			*	*
Mauicetus ? sp. (OKAZAKI, oral)	*				
Amynodon ? sp. (unreported)			*		
Aves					
plotopterid, spp. (HASEGAWA, *et al.* 1979)	*	*	*	*	
Reptiles					
Chelonia, gen. et spp. indet. (unreported)	*	*	*	*	
Trionyx sp. (unreported)		*			
Geoemyda takasago MATSUMOTO (1929)					*

Systematic description

Family Squalodontidae

Genus *Metasqualodon* HALL, 1911

Type species; *Zeuglodon harwoodii* SANGER, 1881, *Proc, Linn. Soc. New South Wales*, 5, pt. 3: 298–300.

Metasqualodon symmetricus OKAZAKI, 1982

Metasqualodon symmetricus. OKAZAKI, 1982; *Bull. Kitakyushu Mus. Nat. Hist.*, 4: 107–112.
Metasqualodon symmetricus. OKAZAKI, 1985; *in* Evolution and Adaptation of Marine Vertebrates: 119–123.

(1) Katashima Specimen; right mandible with two cheek teeth. KMNH VP 000,008

Locality; Northern coast of Katashima Island, near Umashima Island, Kitakyushu City, Japan.

Horizon; equivallent of the Waita Formation, Ashiya Group.

Discovery; by Mr. Toshiyuki KAMEI, Kitakyushu Natural History Society, Kitakyushu City, in 1983.

Description;

Almost perfect right mandible with two cheek teeth preserved; middle of ventral side of ramus destroyed. Only the lingual side of the mandible and alveolar openings has

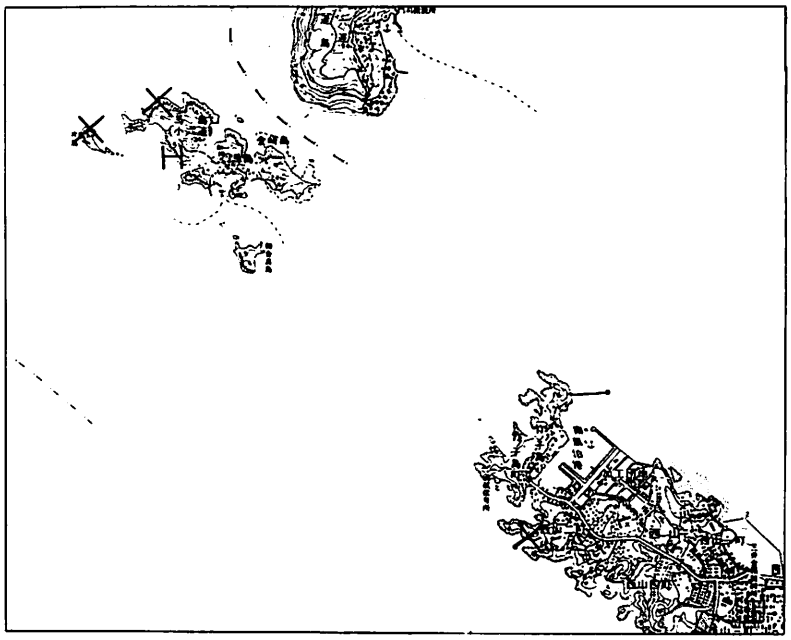

Fig. 1. Location of the materials of *Metasqualodon symmetricus.*※
H; holotype specimen
X; materials reported here.

been cleaned up.

Mandible slender and straight but rather short, with thin coronoid process. Ventral outline of the ramus straight, its margin in section rounded. Lingual face of the mandible flat, with a large mandibular foramen at posterior to the apex of the coronoid process. The anterior margin of the foramen being rounded but somewhat angular at the anterodorsal part. Articular facet rather small and thin, obliquely directed internally. Coronoid process being flared at the middle part of the height, and upper part directed externally. Posterior margin of the coronoid process very thin, but thicker in the anterior side, which have alveolar openings in its anterior part. In the middle to anterior part of the ramus, weak and shallow groove observed along the midline of ramus. Symphysis short, with a deep groove antero-ventrally.

A well-preserved anterior cheek tooth is located in its alveola, although not in its original position. Anterior to this tooth, four alveolar openings are observed. The tooth is called first buccal tooth below, judging from the number of anterior alveoli.

Posterior to the first buccal tooth, six pairs of alveoli, with one fragmental tooth (third buccal tooth), situated along shallow alveollar groove. The first buccal tooth has a single

※：国土地理院発行の２万5000分の一地形図「下関」・「六連島」を使用。

root with groove along its lingual (at least) side.

The first buccal tooth with triangular crown. Both anterior and posterior cutting edges with accessory cusps in only basal part; one distinct and a minute anteriorly and three posterior accessory cusps. Tooth with rugose ornamentations on lingual surface at mainly basal part, but most basal zone smooth. Crown without median notch in the lingual side. Apex of main cusp sharp, with straight and sharp cutting edges on both sides. No worning surface or trace is observed.

Followings are measured (in mm).

Total length as preserved	513
Length from anterior end to apex of coronoid process	408
Height of ramus at widest part near symphysis	39.6
Height of ramus at the first buccal tooth	37.7
Height of coronoid process from ventral margin of ramus	146
Height of mandible at posterior to the coronoid process	90.5
Height of mandibular foramen	75.0
Length from anterior margin of mandibular foramen to posterior end of articular face	109
Length of anterior end to posterior end of alveoli	322

Distance from distal margin of alveola I_1 to that of each alveola

I_2:	24.9	I_3:	54.1	C:	85.8	B_1:	122.6	B_2:	162.9
B_3:	196.8	B_4:	231.1	B_5:	261.8	B_6:	284.5	B_7:	306.9

Height of crown of first buccal tooth	14.8
Length of anterior cutting edge of first buccal tooth	15.6
Length of posterior cutting edge of first buccal tooth	16.6
Medial-distal length of crown of first buccal tooth	18.4
Medial-distal length of root of first buccal tooth	17.1
Length of posterior cutting edge of third buccal tooth	21.0
Lingal-buccal thickness of ramus at third buccal tooth	19
Lingal-buccal thickness of ramus at posterior end of alveoli	23.7

(2) Umashima isolated tooth; Lower anterior cheek tooth. KMNH VP 000,009

Locality; west coast of Umashima Island, Kitakyushu City, Japan.

Horizon; equivallent of the Waita Formation, Ashiya Group.

Discovery; by Yoshihiko OKAZAKI, Kitakyushu Museum of Natural History, May 22. 1984.

Description;

Almost perfect lower anterior cheek tooth of right side.

Crown triangular, with accessory cusps on its posterior cutting edge; two distinct and two minute accessory cusps. Buccal surface of crown smooth and more convex than lingual. Median notch of crown distinct in buccal side but weak in lingual side. Many

rugose striations on the lingual surface of crown, especially on its basal part. Basal smooth area being very narrow. Apex of crown with worn facet. Root single but with median groove on both sides.

Measurements (in mm).

Total height as preserved	26.8
Height of crown in lingual side	12.9
Height of crown in buccal side	13.0
Height of crown from median notch to apex in buccal side	10.1
Length of anterior cutting edge	13.5
Length of posterior cutting edge	14.0
Medial-distal length of crown	11.0
Medial-distal length of root	8.6
Lingual-buccal thickness of crown	5.4
Lingual-buccal thickness of root	3.9

(3) Hikoshima isolated tooth; Upper canine tooth. KMNH VP 000,010

Locality; west coast of Hikoshima Island, Shimonoseki City, Yamaguchi Prefecture, Japan.

Horizon; equivallent of the Waita Formation, Ashiya Group.

Discovery; by Mr. Masahiro SATO, Kitakyushu Natural History Society, Kitakyushu City, in 1984.

Description;

An almost perfect tooth with root preserved; crown conical, with anterior and posterior cutting edges without accessory cusps. Both lingual and buccal sides smooth. Cutting edges with very minute serrations near apex. Root being single and cylindrical. Root twisted remarkablly.

Measurements (in mm).

Height as preserved	40.5
Crown height	13.7
Medial-distal diameter of crown	8.5
Lingual-buccal diameter of crown	6.7

Discussion

The holotype of *Metasqualodon symmetricus* is characterized by arrangement of accessory cusps. The present lower jaw, KMNH VP 000,008, shows similar characters in posessing symmetrical arrangement, divergent direction of accessory cusps and the small size of anterior cheek tooth. Fragmental middle cheek tooth show also similar shape, so far as known, with those of the holotype. The size difference between the present jaw and the holotype may be caused by individual variation, because the size of the teeth is almost concordant, but the teeth distances are much longer in the present jaw.

The isolated lower cheek tooth, KMNH VP 000,009, is the first buccal tooth, judging from its number and arrangement of the accessory cusps.

The isolated upper tooth, KMNH VP 000,010, is canine of right side judging from its twisted root and ornamentations.

The present report shows a data to estimate the cranial proportion of the *Metasqualodon,* which have been reported only isolated teeth except the holotype of *Metasqualodon symmetricus*. Short rostrum and also short symphysis are concordant with the proportion of the holotype (OKAZAKI 1985).

Furthermore, the species have been found only from the Waita Formation, so far as known, although other squalodontid species are discovered from several horizons of the Ashiya Group.

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Plate 3

Explanation of Plate 3.

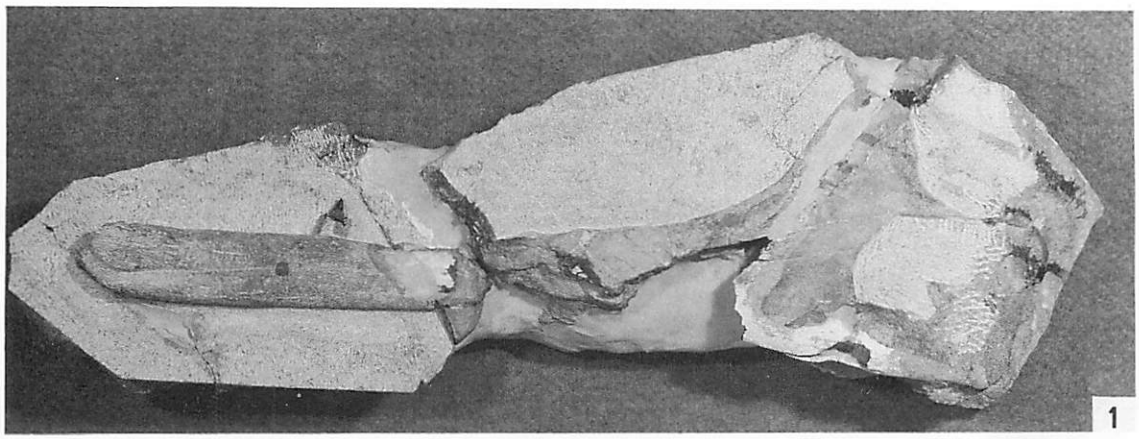
Metasqualodon symmetricus OKAZAKI

Fig. 1. Katashima specimen; KMNH VP 000,008.
Right lower jaw from Katashima, Lingual side. × 0.25

Fig. 2. First buccal tooth of the Katashima specimen;
KMNH VP 000,008. × 2
2a; crown view.
2b; lingual view.

Fig. 3. Umashima isolated tooth; KMNH VP 000,009. × 2
3a; anterior view.
3b; lingual view.
3c; buccal view.
3d; posterior view.

Fig. 4. Hikoshima isolated tooth; KMNH VP 000,010. × 2
4a; lingual view.
4b; anterior view.
4c; buccal view.
4d; posterior view.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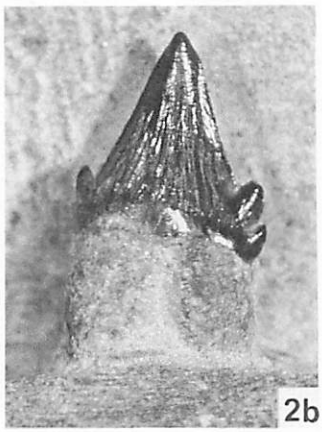
2a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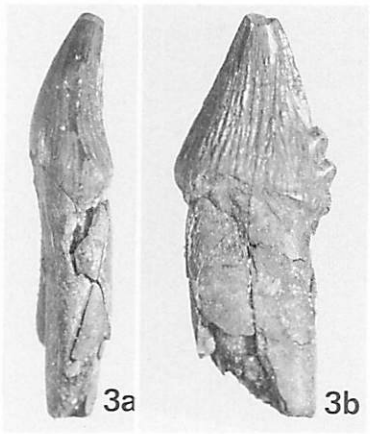
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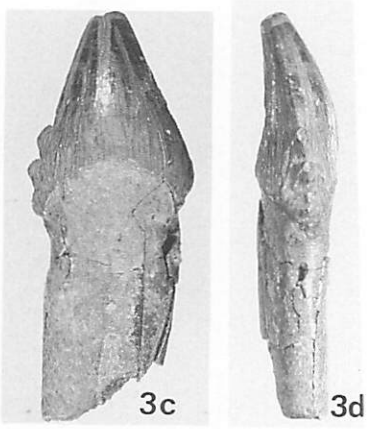
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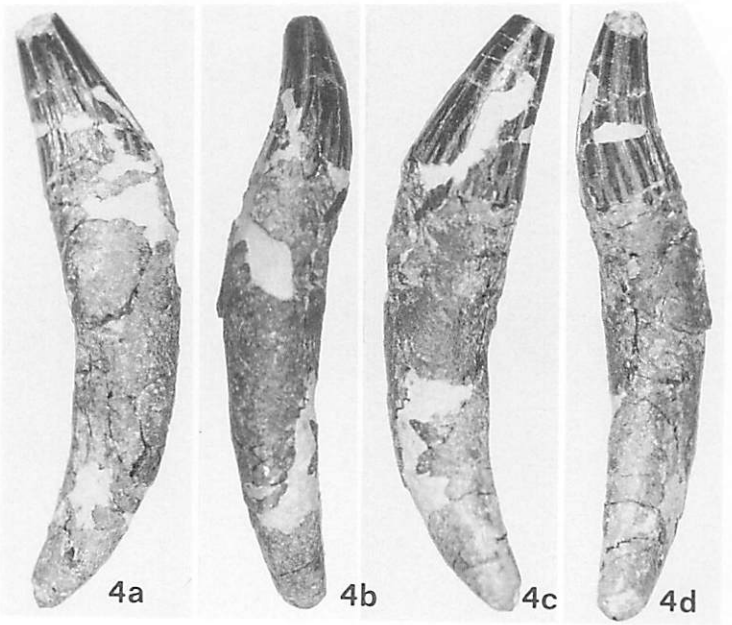
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4b
4c
4d