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A New Snake Eel, *Muraenichthys borealis*, from Aomori, Northern Japan

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Abstract A new ophichthid eel, *Muraenichthys borealis*, is described on the basis of ten specimens from the coast of Aomori Prefecture, the northernmost district of Honshu, Japan. This species is most closely related to *M. gymnotus* in morphometric characters and vertebral counts, but clearly differs from it in having a prominent median toothed groove on the ventral side of the snout and biserial prevomerine teeth.

The ophichthid eel genus *Muraenichthys* Bleeker contains about 20 or more species (McCosker, 1979). Four of these species including *M. gymnotus* are known from the Japanese waters (Matsubara, 1955; Asano, 1984). In this study we reexamined the specimens of this genus from the coast of Aomori Prefecture, Japan, which were previously reported as *M. gymnotus* by the junior author (Shiogaki, 1982). Though morphometric characters and vertebral counts of the present species agree well with those of *M. gymnotus*, it clearly differs from the latter in the features of the ventral side of its snout and the dentition of its prevomer. It is described as *Muraenichthys borealis* sp. nov. in this paper.

The methods of taking counts and measurements follow McCosker (1979).

The present material is deposited in the Department of Biology, Faculty of Science, Kochi University (BSKU), and in the National Science Museum, Tokyo (NSMT).

Comparative material. Eight specimens of *Muraenichthys gymnotus*: California Academy of Sciences (CAS) 64946, 179-267 mm total length (TL), 13°14′24″N, 144°40′13″E, south of Merizo Village, Guam, 0-9 ft., coll. by Fehlmann et al., Oct. 10, 1958.

Muraenichthys borealis sp. nov.
(New Japanese name: Kitano-umihebi)
(Figs. 1-3)

Muraenichthys gymnotus: Shiogaki, 1982: 12 (listed); Asano, 1984: 30 (in part).
Schismorhynchus sp.: Shiogaki, 1988: 155 (listed); Matsuura et al., 1988: 165 (listed).

Holotype. BSKU 45367, 460 mm TL, Tairadate, Mutsu Bay, Aomori Pref., northernmost district of Honshu, Japan, angled by a flatfish longline, 50-60 m deep, late Feb., 1984.

Paratypes. Eight BSKU and one NSMT specimens from Aomori Pref.: BSKU 45365, 357 mm TL, Moura, Mutsu Bay, swimming at sea surface, Jun. 11, 1978; BSKU 45366, 448 mm TL, Ushitaki Fishery Port, Sai, Shimokita Pen., deserted on sandy beach, Nov. 1, 1980; BSKU 45368-45373, 6 specimens (45371 cleared and stained), 316-459 mm TL, and NSMT-P 30813, 354 mm TL, Noushi, Higashi-dohri, Shimokita Pen., caught by scallop dredges, 10-30 m deep, early Apr., 1984.

Diagnosis. A large species of *Muraenichthys* with: a prominent median toothed groove extending beyond middle of snout on ventral side of snout; biserial teeth on maxillary, dentary and prevomer; dorsal fin origin less than one head length behind anus; preanal length slightly shorter than tail length; posterior margin of eye only slightly in advance of posterior corner (rictus) of mouth; length of anterior nasal tube 3.6-4.5 times in eye diameter; snout pointed; eye diameter 13-17 times in head length; body depth 36-63 times in TL; and total vertebrae 131-137.

Description. Counts and proportional measurements are given in Table 1. Body elongate and subcylindrical, slightly tapering and compressed posteriorly. Preanal length slightly shorter than tail length (Fig. 1). Tip of tail with a short and round caudal fin. Head small. Gill-opening lateral, a constricted hole about equal to eye. Snout short, pointed, extending beyond tip of lower jaw (Fig. 2 A). Distance between tip of snout and tip of lower jaw subequal to eye diameter. Tip of lower jaw at a vertical through posterior base of anterior nostril or slightly in advance of it. Ventral side of snout with a prominent median toothed groove extending ante-

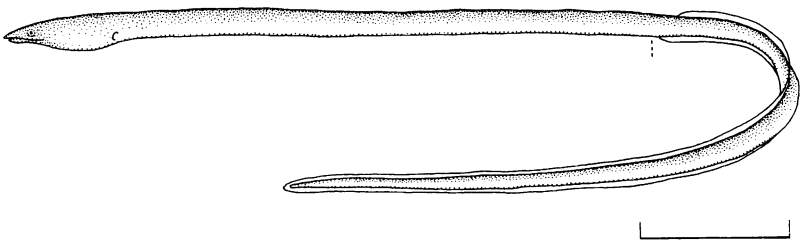

Fig. 1. *Muraenichthys borealis* sp. nov., BSKU 45367, holotype, 460 mm TL, from Tairadate, Mutsu Bay, Aomori Pref., Japan. Scale bar indicates 5 cm.

Table 1. Proportional measurements and meristic counts of the type-specimens of *Muraenichthys borealis* sp. nov.

	Holotype BSKU 45367	Nine paratypes
Total length (mm)	460	316–459
Measurements		
In % of total length		
Head length	8.2	8.3–9.6
Tail length	53.3	53.5–54.8
Preanal length	46.7	45.2–46.5
Body depth	1.9	1.6–2.8
In % of head length		
Head depth	24.9	21.8–29.1
Head width	19.0	17.9–24.5
Anus to origin of dorsal fin	21.7	16.2–52.5
Eye diameter	6.9	6.0–7.7
Interorbital width	10.6	7.9–11.5
Snout length	19.0	17.0–20.7
Upper jaw length	30.6	26.1–31.8
In % of snout length		
Eye diameter	36.1	33.6–46.3
In % of eye diameter		
Anterior nasal tube	25.0	23.7–28.0
Counts		
Lateral line pores before anus	58	55–60
Total vertebrae	135	131–137

riorly beyond middle of snout (Fig. 2B). Eye small, circular to slightly oblong. Posterior margin of eye slightly anterior to rictus of mouth. Interorbital region weakly convex. Anterior nostril tubular, its length less than one-third eye diameter. Posterior nostril a large opening entirely inside upper lip.

Teeth small, conical; biserial in jaws, the outer row teeth smaller (Fig. 3). Prevomerine teeth biserial, extending backward beyond posterior margin of eye. Intermaxillary teeth partly exposed when mouth is closed, arranged in a circular pattern.

Sensory pores on head are as follows (Fig. 2): 5 on

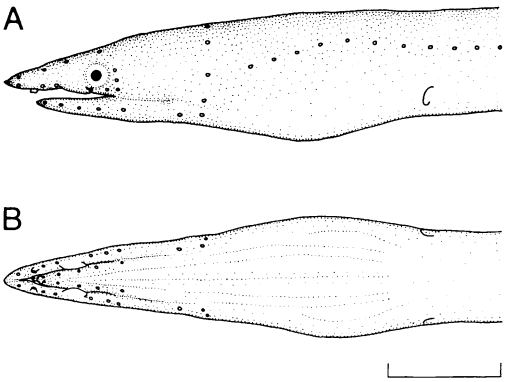

Fig. 2. Head of *Muraenichthys borealis* sp. nov., BSKU 45367, holotype, 460 mm TL. A, lateral view; B, ventral view. Scale bar indicates 1 cm.

supraorbital, 4 on infraorbital, 1 on interorbital, 3 on postorbital, 5 on mandible, 3 on preopercle, and 2 on supratemporal commissure.

Pectoral fins absent. Median fins low, dorsal and anal fins continuous with short caudal fin. Origin of dorsal fin posterior to anus at a distance of 1.9–6.2 times in head length. Anal fin origin one eye diameter behind anus.

Color in spirit: Uniformly greyish-brown, tinted yellow on belly. Color in alcohol: Lower jaw and upper half of body and tail light-brown, the lower half except for lower jaw creamy yellow. Vertical fins much paler.

Distribution. Known only from the coastal region of Aomori Prefecture, the northernmost district of Honshu, Japan, at depths less than 60 m (Fig. 4).

Etymology. This species is named *borealis* in reference to its northern occurrence in comparison with the other members of the genus.

Remarks. Judging from the key to the genera of the family Ophichthidae by Rosenblatt and McCosker (1970), the present species fits within the genus *Muraenichthys* except for its median toothed groove on the ventral side of the snout. Though the

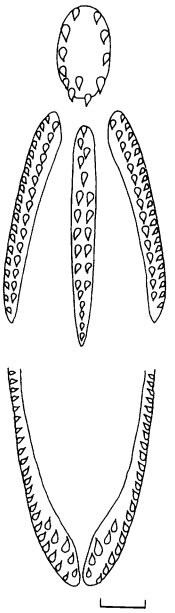

Fig. 3. Dentition of *Muraenichthys borealis* sp. nov., BSKU 45371, paratype, 450 mm TL, from Noushi, Shimokita Pen., Aomori Pref., Japan. Scale bar indicates 1 mm.

present species shares this character with *Schismorhynchus*, a closely related genus to *Muraenichthys*, one of the diagnostic characters of *Schismorhynchus* is a long anterior nasal tube equal to the eye diameter (McCosker, 1970). The length of the nasal tube in the present species is apparently less than one-third of the eye diameter. *Schultzidia*, another closely related genus, markedly differs from *Muraenichthys* in lacking prevomerine teeth (Gosline, 1951; Schultz, 1953; Rosenblatt and McCosker, 1970; McCosker, 1970). Therefore, we consider the present species as a member of *Muraenichthys*.

McCosker (1970, 1977) recognized 19 species in the genus *Muraenichthys*. Subsequently, *M. breviceps* which was treated as a junior synonym of *M. macropterus* in his previous studies was regarded as a valid species, and one new species, *M. puhioilo* from Oahu, was added (McCosker, 1979). Judging from the keys to the species of *Muraenichthys* (Schultz and Woods, 1949; Schultz, 1953; McCosker, 1970), the descriptions of *M. gymnotus* by Bleeker (1864) and Schultz (1953), and the *M. gymnotus* specimens examined in this study, the present new species, *M. borealis*, agrees well with *M. gymnotus* in important morphometric characters: dorsal fin origin less than one head length behind anus, preanal length slightly

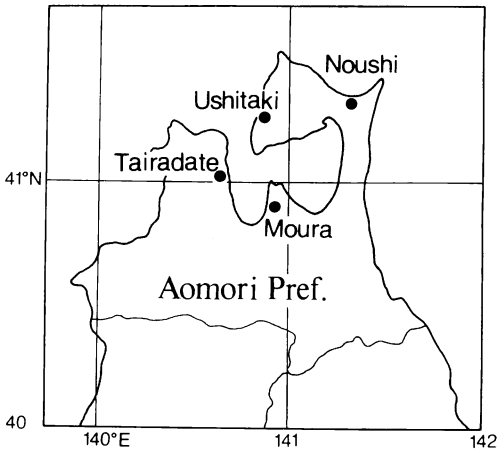

Fig. 4. Location where the type-specimens of *Muraenichthys borealis* sp. nov. were collected.

shorter than tail length, posterior margin of eye slightly in advance of rictus of mouth, body depth 36–63 times in TL, and eye diameter 13–17 times in head length. Vertebral counts of *M. gymnotus* are scarcely known; McCosker (1977) reported 129 and 130 total vertebrae for two specimens, and the holotype has 137 total vertebrae (McCosker, pers. comm.). In the present comparative material, it ranges from 134 to 137. In *M. borealis*, it varies from 131 to 137 indicating no difference between the two species in this character. However, *M. gymnotus* lacks a median toothed groove on the ventral side of the snout. In addition, it is known to have uniserial prevomerine teeth (Bleeker, 1864; Schultz, 1953). We confirmed this in the present comparative material. *M. borealis* possesses biserial prevomerine teeth. Thus, the two species are clearly separable in these two characters.

The most recently described species, *M. puhioilo* (McCosker, 1979), is easily distinguishable from *M. borealis* in having a dorsal fin origin anterior to the anus vs. slightly behind the anus in the latter, teeth uniserial throughout vs. biserial in jaws and on prevomer, and 160 total vertebrae vs. 131 to 137.

Although *M. aoki*, described on the basis of a single specimen from Japan (Jordan and Snyder, 1901), has been regarded as a junior synonym of *M. gymnotus* by many authors (e.g. Schultz, 1953; Matsubara, 1955; McCosker, 1970), it may be a valid species (McCosker, pers. comm.). The holotype of *M. aoki* has 137 total vertebrae (McCosker, 1977), which overlaps with that of *M. borealis*. However, *M. aoki* lacks a median toothed groove on the ventral

side of the snout, and has seven well developed prevomerine teeth arranged in a single row (E. Anderson, pers. comm.).

M. borealis occupies a variety of sand and gravel habitats shallower than 60 m around Aomori Prefecture. This fish is known to fishermen who engage in scallop dredgings and flatfish longlines in Mutsu Bay as a rare snake eel. Maruyama (1971) reported the occurrence of a single specimen of *Ophisurus macrorhynchus* from the Pacific off Iwate Prefecture, adjacent to Aomori Prefecture, though no description was given. But judging from the figure shown, it is probable that the specimen is *M. borealis*. In the Japanese waters, *O. macrorhynchus* is known from the southern district of Honshu, Japan (Matsubara, 1955; Asano, 1984; Machida, 1984).

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青森県沿岸産のウミヘビ科の新種キタノウミヘビ

町田吉彦・塩垣　優

青森県沿岸の水深 60 m 以浅で採集された 10 個体に基づき，ウミヘビ科ミミズアナゴ属の新種 *Muraenichthys borealis* キタノウミヘビを記載した．本種は背鰭始部が肛門より後方に位置し，その距離は頭長より短かいこと，尾部は全長の半分より僅かに

長いこと，眼の後縁は口裂後端より僅か前方に位置すること，全長は体高の 36–63 倍であること，頭長は眼径の 13–17 倍であること，総脊椎骨数が 131–137 個であることで *M. gymnotus* ミミズアナゴに似る．しかしながら，本種はミミズアナゴとは吻下面正中線上に前方に伸びる明瞭な裂溝があること（後者にはない），前鋤骨歯が 2 列をなすこと（後者では 1 列）で容易に区別できる．本種は同属の他種に比べより北方に産するので，それにちなんだ種小名と和名を与えた．丸山 (1971) によりダイナンウミヘビとして岩手県から報告された種は本種と思われる．

（町田：780 高知市曙町 2–5–1 高知大学理学部生物学教室；塩垣：039–34 青森県東津軽郡平内町大字茂浦　青森県水産増殖センター）