# Papers Published in *Japanese Journal of Ichthyology*

**Vol. 65, No. 1, April 25, 2018**

## CONTENTS

### *Original Papers*

## *Notes*

## *Original Papers*

*Japanese Journal of Ichthyology*
*Vol. 65, No. 1, pp. 1–7*

**Examination of trophic discrimination factors and lipid corrections in muscle, ovary and mucus tissues of ayu (*Plecoglossus altivelis altivelis*) using carbon and nitrogen stable isotope analyses**

Hayato Sawada*, Ryuji Yonekura and Atsushi Maruyama

**Abstract** Carbon and nitrogen stable isotope ratios ($\delta^{13}C$ and $\delta^{15}N$, respectively) have been widely used to estimate food habits of animals, based on constant differences in isotope ratios between such animals and their diets, namely, trophic (diet–tissue) discrimination factors (TDF). However, recent studies have found the latter to vary more between different tissues or species than recognized previously. An aquarium experiment, in which ayu (*Plecoglossus altivelis altivelis*), a representative Japanese freshwater fishery resource, were cultivated with isotopically identical food (well-mixed commercial fish food), thereby obtaining TDF specific to muscle tissue, ovarian tissue and epidermal mucus, enabled estimation of the effect of lipid content on $\delta^{13}C$ values. That in muscle tissue was 0.8‰–5.6‰ higher in lipid-eliminated samples than in untreated ones and was dependent on bulk C:N ratios, whereas the lipid content and its effect were constant in ovarian tissue. Lipid correction equations specific to muscle tissue of ayu were obtained by regressions on bulk C:N ratio, according to previously reported models. Lipid-free TDF in $\delta^{13}C$ values differed between muscle tissue (2.4‰), ovarian tissue (1.9‰) and epidermal mucus (1.0‰). TDF in $\delta^{15}N$ values also differed between muscle tissue (2.5‰), ovarian tissue (1.6‰) and epidermal mucus (1.5‰). The TDF and lipid correction equations for ayu demonstrated in this study enable accurate estimation of food habits and migration ecology of the species.

*(*Corresponding author: Department of Science and Technology, Ryukoku University, 1–5 Yokotani, Seta-Oe, Otsu, Shiga 520–2194, Japan; e-mail: hayato.5737@gmail.com)*

*Japanese Journal of Ichthyology*
*Vol. 65, No. 1, pp. 9–20*

**Life history and seasonal migration of the endangered bitterling *Acheilognathus tabira jordani* in Shimane Prefecture, Japan**

Chika Oshiumi*, Toshihiko Kobayashi and Hidenobu Kunii

**Abstract** The life history and seasonal migration of the critically endangered freshwater fish *Acheilognathus tabira jordani* was studied in an undisclosed river in Shimane Prefecture, from April 2011 to November 2012. A total of 705 individuals were captured and marked by hypodermic injection of fluorescent elastomer tags, and released to clarify growth and migration of each individual. Based on ovulation and ovipositor length, breeding of *A. tabira jordani* occurred from ca. May 15 to July 20 in 2011, and ca. April 20 to July in 2012, peaking in May and June of both years. The 2011 spawning season started later, possibly due to lower water temperature in April, than in the following year. One-year-old fish formed two

cohorts from April to June, possibly due to the differences in spawning time. The smaller cohort had a high growth rate from May to July, becoming integrated with the larger cohort in July 2012. This suggests that small cohort individuals invested their energy in growth without breeding. Mature female and male fish aggregated downstream, where mussels were abundant, during the main spawning season, but in upper streams waters in autumn and winter, where mussels were less abundant. The maximum distance migrated between the spawning and non-spawning seasons was estimated as ca. 5300 m.

*(*Corresponding author: The United Graduate School of Agricultural Science, Tottori University, 4–101 Minami, Koyama-cho, Tottori 680–8553, Japan; e-mail: nanagure@ hotmail.com)*

*Japanese Journal of Ichthyology*
*Vol. 65, No. 1, pp. 21–25*

**First Japanese record of the Freckleface Reef-eel *Uropterygius xanthopterus* from Kakeroma-jima island, Japan**

Keita Koeda*

**Abstract** *Uropterygius* Rüppell, 1838 (Muraenidae) currently includes 21 valid species, six (one unidentified) having been recorded from Japanese waters, mostly off the Pacific coast of southern Japan to the Ryukyu Archipelago. The genus is characterized by a moderately elongate, laterally compressed body, the median fins restricted to the tail tip, and a small, slit-like gill opening. A single specimen (158.7 mm total length) of *U. xanthopterus* Bleeker, 1859 collected from Kakeroma-jima island, Amami Islands, Japan, was newly identified in museum collections, being characterized by 119 vertebrae, two lateral-line pores, and a dark brown body with three rows of stellate whitish to pale grey blotches, pale dots anteriorly and on the head, and a bright yellow tail tip. Previously known from the Maldives and Chagos Archipelagos to Micronesia and French Polynesia, and north to Taiwan, *U. xanthopterus* is recorded from Japan for the first time, the Amami Islands specimen being the northernmost known record. The new standard Japanese name "Kakeroma-kikaiutsubo" is proposed for the species.

*(*National Museum of Marine Biology & Aquarium, 2 Houwan Road, Checheng, Pingtung 94450, Taiwan; e-mail: hatampo@gmail.com)*

*Japanese Journal of Ichthyology*
*Vol. 65, No. 1, pp. 27–34*

**Records of *Parapercis kentingensis* (Perciformes: Pinguipedidae) from Japan**

Rei Matsuo, Mizuki Matsunuma, Hiroyuki Motomura and Seishi Kimura*

**Abstract** Two sandperches, *Parapercis kentingnesis* Ho, Chang and Shao, 2012 and *Parapercis shaoi* Randall, 2008 (Pinguipedidae), are extremely similar to each other, having overlapping meristic values and eight red-orange bars on the body below the midlateral line. Although the species have been considered to co-occur in southern Japan, examination of the single paratype of *P. shaoi* from Amami-oshima Island, Kagoshima

Prefecture confirmed its identity as *P. kentingensis*. Because the Amami-oshima Island specimen is the only known example of "*P. shaoi*" from Japan, the Japanese record of that species is now considered erroneous. A description, including morphological variations, of 14 Japanese examples of *P. kentingensis* (including the above paratype of *P. shaoi*) is provided and comparisons made with related species. *Parapercis kentingensis* is distinguishable from other congeners by the following combination of characters: eight brown blotches dorsolaterally on body; dark brown dots (size similar to exposed area of scale) lining lower edge of aforementioned blotches; a large brownish elliptical blotch on upper edge of opercle; an oblique yellow bar fringed with red-orange below eye; one to four small red spots on cheek; three longitudinal rows of small reddish-brown spots on dorsal fin; four or five vertical rows of small red-orange spots on caudal fin; lateral-line scales 52–54; three pairs of canine teeth anteriorly on lower jaw; palatine edentate; a single semi-circular row of stout teeth on vomer; posterior edge of preopercle smooth; upper tip of caudal fin slightly elongated; tip of pelvic fin not reaching to anal-fin origin. Because some Japanese specimens lacked small reddish-orange spots anterior to the pectoral-fin base, that characteristic can no longer be considered diagnostic of *P. kentingensis*.

*(*Corresponding author: Fisheries Research Laboratory, Mie University, 4190–172 Wagu, Shima-cho, Shima, Mie 517–0703, Japan; e-mail: kimura-s@bio.mie-u.ac.jp)*

*Japanese Journal of Ichthyology*
*Vol. 65, No.1, pp. 35–39*

**First Northern Hemisphere record of the Tailspot Goatfish *Upeneus spottocaudalis* (Perciformes: Mullidae) from Kagoshima, Japan**

Ayumi Bandai, Masahide Itou and Hiroyuki Motomura*

**Abstract** A single specimen (95.6 mm standard length; SL) of the goatfish *Upeneus spottocaudalis* Uiblein and Gledhill in Uiblein et al., 2017 (Perciformes: Mullidae), collected east of Sakinoyama, Kataura, Kasasa, Minami-satsuma, Kagoshima Pref., southern Japan at a depth of 27 m, and possessing seven dorsal-fin spines, 13 pectoral-fin rays, 23 gill rakers, head length 29.6% of SL, four indistinct black blotches on a red stripe along the lateral line, and four black blotches edged with red on the lower caudal-fin lobe, was easily distinguished from all other goatfish species by the last-mentioned character. Belonging to the *Upeneus japonicus*group (characterized by having seven dorsal-fin spines, 20–32 total gill rakers, 12–15 pectoral-fin rays, and bars on the upper caudal-fin lobe when fresh), *U. spottocaudalis* is the fourth member of the group [together with *U. guttatus* (Day, 1868), *U. itoui* Yamashita, Golani and Motomura, 2011 and *U. japonicus* (Houttuyn, 1782)] recorded from Japanese waters, having been previously known only from northeastern Australia and southern Indonesia. A new standard Japanese name "Yukata-himeji" is proposed for the species, the Kagoshima specimen being the first record from the Northern Hemisphere.

*(*Corresponding author: The Kagoshima University Museum, 1–21–30 Korimoto, Kagoshima 890–0065, Japan; e-mail: motomura@kaum.kagoshima-u.ac.jp)*

*Japanese Journal of Ichthyology*
*Vol. 65, No. 1, pp. 41–47*

**New record of a snake eel *Myrichthys paleracio* collected from Iriomote Island, Okinawa Prefecture, Japan**

Atsushi Tawa*, Yoshitaka Tahara and Yusuke Hibino

**Abstract** Snake eels in the genus *Myrichthys*, characterized by molariform teeth, moderate to very elongate body, short snout, dorsal fin origin before gill openings, short pectoral fin, anterior nostrils tubular and elongate, posterior nostrils opening into mouth, and spotted and/or striped coloration, include 10 valid species and are commonly found along most tropical shores worldwide. Two species, *Myrichthys colubrinus* (Boddaert, 1781) [striped coloration] and *Myrichthys maculosus* (Cuvier, 1816) [spotted coloration], having been previously recorded from Japan, *Myrichthys paleracio* McCosker and Allen, 2012 is described here from two specimens found in the stomach contents of a sea snake *Laticauda laticaudata*(Linnaeus, 1758) from Iriomote Island, Okinawa Prefecture, Japan, being the first speciemen-supported record of the species from Japan and the northernmost record of distribution. *Myrichthys paleracio* most closely resembles *M. colubrinus*in having striped body coloration, but differs in having 183 total vertebrae (vs. 193–202) and more than 50 irregularly patterned brown stripes (vs. 25–35 arranged in a regular pattern). The absence of an ethmoid pore on the head in one specimen was considered to be a malformation. A new standard Japanese name "Madara-shima-umihebi" proposed for the species. An underwater photograph of a snake eel from Yakushima Island, Kagoshima Prefecture, Japan, was identified as *M. paleracio*.

*(*Corresponding author: National Research Institute of Far Seas Fisheries, 5–7–1, Orido, Shimizu, Shizuoka 424–8633, Japan; e-mail: a-tawa@hotmail.co.jp)*

*Japanese Journal of Ichthyology*
*Vol. 65, No. 1, pp. 49–57*

**Trial of whole-organ and whole-body clearing in fish**

Shingo Udagawa, Fumi Yada and Akihiro Takemura*

**Abstract** Sca*l*eCUBIC-1, the newly-developed reagent for tissue clearing and decolorization, was trialed on the Malabar grouper (*Epinephelus malabaricus*), goldlined spinefoot (*Siganus guttatus*), and sapphire devil (*Chrysiptera cyanea*). After perfusion fixation with 4% paraformaldehyde (PFA) from the caudal vein of the Malabar grouper, tissues (brain, heart, spleen, liver, intestine, gill, eyes, and muscle) were dissected and post-fixed in 4% PFA at 4˚C for 24 hrs, before being immersed in Sca*l*eCUBIC-1. Subsequently, the brain, spleen, intestine, gill, and muscle (but not skin or scale) were found to have been completely cleared, and the heart and liver partially so. Due to the thickness of the organ, deeper regions of the liver were not cleared. The failure of eye-clearing and decolorzation was partially due to pigmentation of the former. Similar results were obtained for tissues of the juvenile goldlined spinefoot and mature sapphire devil, following immersion in Sca*l*eCUBIC-1 for 5 days. Whole body cleaning and decolorzation were also trialed on the

goldlined spinefoot and sapphire devil. Following removal of the scales and skin, the immersion of specimens in Sca*l*eCUBIC-1 for 14 days resulted in successful clearing and decolorzation of the muscles of both species. It was concluded that Sca*l*eCUBIC-1 is suitable for clearing and decolorzation of fish tissues, including whole body, although modifications in the procedure may be required for different fish species.

*(*Corresponding author: Faculty of Science, University of the Ryukyus, 1 Senbaru, Nishihara, Okinawa 903–0213, Japan; e-mail: takemura@sci.u-ryukyu.ac.jp)*

*Japanese Journal of Ichthyology*
*Vol. 65, No. 1, pp. 59–66*

**Life history of *Pseudogobius masago* in the Manko Wetland, Okinawa-jima Island, southern Japan**

Hirotoshi Saimaru*, Taiga Kunishima and Katsunori Tachihara

**Abstract** *Pseudogobius masago*, an endangered mud-dwelling goby inhabiting mudflats in Japan, is threatened by habitat loss due to human activities, such as land-fills and coastal development. However, basic information for this species is scarce, especially on Okinawajima Island, the southernmost known population. Life history traits of the species, including longevity and maturity, were investigated by a monthly sampling program conducted at Manko Wetland, Okinawa-jima Island, from March 2010 to November 2012. The spawning season of *P. masago* was determined from histological observations of ovaries and appearance of recruits over a year long period. The estimated batch fecundity was 202–542 eggs, fewer than that determined for individuals on the Japanese mainland (264–961). Daily increments of sagittal otoliths were counted for age and growth determinations, validation being attempted using alizarin complexone (ALC) fluorescent stain. The maximum life span of *P. masago* was found to be ca. four months, individual maturation and survival differing seasonally, being dependent upon birth month. *P. masago* was smaller and shorter-lived on Okinawa Island compared with populations in Mie or Fukuoka Prefectures, the overall life history strategy of the species apparently differing with latitude. Populations inhabiting temperate mainland Japan grew larger and produced more eggs over a shorter spawning season, whereas those inhabiting subtropical Okinawa Island grew to a smaller maximum standard length and produced fewer eggs, but had an extended spawning season with overlapping generations. Future conservation of the species is dependent upon reducing human activity on soft mudflats as much as possible.

*(*Corresponding author: Yanagawa High School, 33 Tsurugaoka, Yanagawa, Fukusima 960–0735, Japan; e-mail: sai016104@yahoo.co.jp)*

## *Notes*

*Japanese Journal of Ichthyology*
*Vol. 65, No. 1, pp. 67–70*

**A rare serranid fish, *Liopropoma pallidum* (Perciformes), from the Volcano Islands**

**(southern Ogasawara Islands); third specimen from Japan**

Tomohiro Yoshida*, Kaoru Kuriiwa and Hiroyuki Motomura

**Abstract** A single specimen (61.8 mm standard length) of the serranid *Liopropoma pallidum* (Fowler, 1938), collected in 10–13 m off Minami-iwo Island, Volcano Islands (southern Ogasawara Islands), Japan, is the third example of the species from Japanese waters, two specimens (from northern the Ogasawara Islands) having been previously recorded. A color photograph of the (fresh) specimen is provided.

(**Corresponding author: The United Graduate School of Agricultural Sciences, Kagoshima University, 1–21–24 Korimoto, Kagoshima 890–0065, Japan; e-mail: k5299534@kadai. jp)*

*Japanese Journal of Ichthyology*
*Vol. 65, No. 1, pp. 71–74*

**Amphidromous ayu (*Plecoglossus altivelis altivelis*) in the Toki River (Shonai River Basin), Gifu Prefecture**

Shizuo Aino and Taiga Yodo*

**Abstract** Due to multiple weirs constructed in the Shonai River (lower reach of the Toki River), local belief held that ayu (*Plecoglossus altivelis altivelis*) migration was impeded, local fishery cooperatives therefore managing ayu by seed stocking in the Toki River. However, individuals collected upstream from the Shonai River weirs, their origins discriminated using otolith morphological abnormalities and microchemical analysis, included two that were clearly amphidromous, such being evidence of migration.

*(*Corresponding author: Graduate School of Bioresources, Mie University, 1577 Kurimamachiya, Tsu, Mie 514–8507, Japan; e-mail: tyodo@bio.mie-u.ac.jp)*

*Japanese Journal of Ichthyology*
*Vol. 65, No. 1, pp. 75–80*

**Genetic diversity of the flathead flounder *Hippoglossoides dubius* population in Funka Bay inferred from mitochondrial DNA analysis**

Yuki Yamamoto, Minoru Ikeda, Mitsuhiro Nakaya*, Kota Suzuki and Tetsuya Takatsu

**Abstract** The flathead flounder *Hippoglossoides dubius* population in Funka Bay, characterized by unique ecological features, has been thought to be demographically independent of other conspecific populations. To clarify such, sequence data of the hyper variable domain in the mitochondrial DNA control region was collected from the Funka Bay population and the genetic diversity compared with previously published data for other populations (Sea of Japan and northwestern Pacific off Tohoku‐Hokkaido). Because the level of diversity of the former population differed little from that of other populations, with no significant genetic differentiation detected, it is likely that contemporary or recent historical gene flow has occurred extensively in Japanese coastal waters. The likelihood of gene flow and connectivity among the populations, all characterized by long pelagic egg and larval stages, being associated with the Tsugaru Warm Current is considered.

(**Corresponding author: Faculty of Fisheries, Hokkaido University, 3–1–1 Minato-cho,*

*Hakodate, Hokkaido 041–8611, Japan; e-mail: mnakaya@fish.hokudai.ac.jp)*

*Japanese Journal of Ichthyology*
*Vol. 65, No. 1, pp. 81–84*

**Record of the pufferfish, *Torquigener albomaculosus* from the east coast of Okinawa-jima Island, Ryukyu Islands with comments on its aquarium behavior in an aquarium**

Takayuki Sonoyama*, Keisuke Ogimoto, Toshiaki Ishibashi, Yusuke Suda, Hiroshi Aonuma and Keiichi Matsuura

**Abstract** A specimen of the pufferfish *Torquigener albomaculosus*, previously recorded in depths of 10–30 m off Amami-oshima Island, northern Ryukyu Islands, was collected at 100 m depth by hook and line off Hamahika-jima Island (off east coast of Okinawa-jima Island) and maintained for 136 days in an aquarium whilst swimming and eye closing behavior were observed. Unlike some other pufferfishes, which close their eyes by twisting the encircling skin, *T. albomaculosus* closes employing a vertical "blink", similar to tetrapods.

*(*Corresponding author: Shimonoseki Marine Science Museum, 6–1 Arcaport, Shimonoseki, Yamaguchi Prefecture, 750–0036, Japan; e-mail: sonoyama@kaikyokan.com)*

*Japanese Journal of Ichthyology*
*Vol. 65, No. 1, pp. 85–89*

**New records of *Glossanodon microcephalus* from Japanese waters and the northern East China Sea**

Akane Yoshikawa*, Makoto Okamoto and Yoshiaki Kai

**Abstract** *Glossanodon microcephalus* Endo and Nashida, 2012, previously known only from the South China Sea and off Kochi, Japan, is newly reported from the southern Japan Sea, off Atsumi Peninsula, central Japan, and the northern East China Sea. The new records, expanding the northernmost and easternmost distribution of the species, suggest a widespread distribution ranging from subtropical to temperate waters along the Kuroshio and Tsushima currents.

*(*Corresponding author: Japan Sea National Fisheries Research Institute, Fisheries Research Agency, 1–5939–22 Suido-cho, Chuo-ku, Niigata, 951–8221, Japan; e-mail: ay2477@affrc.go.jp)*

*Japanese Journal of Ichthyology*
*Vol. 65, No. 1, pp. 91–95*

**Third specimen and northernmost records of the rare velvetfish *Cocotropus possi* from Taira-jima island, Tokara Islands, Japan, with a fresh color description**

Keita Koeda* and Hiroyuki Motomura

**Abstract** The third specimen of a rare velvetfish *Cocotropus possi* Imamura and Shinohara, 2008, previously known only from two type specimens from the Okinawa Islands, was collected at a depth of 15 m from Taira-jima island, Tokara Islands, Ryukyu Archipelago,

Japan. The specimen represents the northernmost record for the species. Because the species was originally described on the basis of preserved specimens only, descriptions of morphology and fresh coloration are given here, based on the Tokara Islands specimen and color photographs taken of the latter before preservation.

*(*Corresponding author: National Museum of Marine Biology & Aquarium, 2 Houwan Road, Checheng, Pingtung, 94450, Taiwan; e-mail: hatampo@gmail.com)*