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CONTENTS

Original Papers

Comparison of monitoring methods for reed belt ichthyofauna in a eutrophic lake, central Honshu, Japan

Kouki Kanou, Seiji Usui, Yuta Kawashima and Ken-ichi Yokoi

Re-examination of the native mitotype within wild populations of Japanese medaka (*Oryzias latipes*) in the Kanto region, Japan

Yuka Iguchi, Ryohei Nakao, Keisuke Takata and Tadao Kitagawa

Assessment of recreational fishing impact on the Biwa salmon resource based on redd abundance at ten Lake Biwa inlet streams in 2015

Masanori Oda and Taiga Yodo

Microhabitat use by the endangered Itasenpara bitterling *Acheilognathus longipinnis* (Cyprinidae) during the spawning season in the Moo River, Toyama, Japan

Masaki Nishio, Tomonori Kawamoto, Ryosuke Kawakami, Yasuyuki Hata, Kaneaki Edo and Yuji Yamazaki

First specimen-based records of the Blackcheek Moray *Gymnothorax breedeni* from Yonaguni-jima island, Japan

Keita Koeda and Yuichi Akita

First Japanese record for a species of *Pseudoscopelus* (Acanthopterygii: Chiasmodontidae) lacking discrete photophores

Fumihito Tashiro

Distribution of *Anguilla japonica* and *A. marmorata* in the Nansei Islands, Japan, and their habitat segregation based on local names

Yuichi Kano, Tomomi Yamashita, Wataru Tanaka, Akihiko Koyama and

Kazuki Kanno

Notes

A rare snailfish, *Liparis bikunin*, collected from Iwate, Japan

Yoshiaki Kai and Tsutomu Noda

An early specimen of *Silurus lithophilus* (Siluriformes: Siluridae) found in the Natural History Museum, London

Yusuke Hibino

Original Papers

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Comparison of monitoring methods for reed belt ichthyofauna in a eutrophic lake, central Honshu, Japan

Kouki Kanou, Seiji Usui, Yuta Kawashima and Ken-ichi Yokoi

Abstract Reed belts in temperate lakes support large numbers of fishes and provide nurseries for many species, including some of endangered status or commercial importance. Although monitoring of such assemblages is important for ecological and fisheries assessments in many lakes in Japan, little information exists on appropriate sampling gear for a better representation of fish species richness and composition in reed belts. An evaluation of comparative efficiencies of different sampling methods for monitoring fish assemblages, based on six commonly used gear types [electrofishing (EF), minnow trap (MT), hand net (HN), casting net (CN), seine net (SN) and fyke net (FN)], was conducted in lentic reed belts in a eutrophic lake, Kitaura, Ibaraki Prefecture, central Japan, in June and August 2015. A total of 3,060 individuals, representing 11 families and 26 species, were collected during the study period. The mean number of species per replicate was significantly greater for FN, SN and CN than EF, MT and HN in each month. More than 96% of the total species recorded throughout the study period were collected by a combination of FN and CN. Furthermore, the species composition of the assemblages sampled by FN, SN and CN differed from that by EF, MT and HN, due to the low catch efficiency of the latter. These results suggested that use of multiple gear types, including FN and CN, represents a more efficient method for monitoring lentic reed belt ichthyofauna.

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Re-examination of the native mitotype within wild populations of Japanese medaka (*Oryzias latipes*) in the Kanto region, Japan

Yuka Iguchi, Ryohei Nakao, Keisuke Takata and Tadao Kitagawa

Abstract The current genetic disturbance in wild populations of Japanese medaka (*Oryzias latipes* species complex) has resulted from artificial introductions of non-native populations and the commercial orange-red body color medaka variety ('himedaka'). Because the mitochondrial cytochrome *b* (*cytb*) "mitotype B1a" sensu Takehana et al. (2003) is native to the eastern area around the Seto-Inland Sea (ESIS), as well as occurring in himedaka, it had been believed that the mitotype B1a detected in the Kanto region (eastern Japan) had resulted from artificial introduction from ESIS or through himedaka. This study, based on sequencing and RFLP analyses of the mitochondrial hyper-polymorphic gene (ND2) in 99 *O. latipes* and 9 himedaka individuals, revealed three additional haplotype groups (I, II and III) in the mitotype B1a. The major haplotype group (Group I) apparently represents an artificial introduction, originally from ESIS or himedaka. However, Group II seemed to be native to the Kanto region, to which it was limited, since it was genetically divergent from the other groups. In addition, group III was found to belong not to mitotype B1a but to another mitotype, the ambiguous RFLP banding patterns found in the *cytb* analysis of the two mitotypes seemingly having led to the former misconception. To avoid such misunderstanding, more accurate analyses, such as sequencing or RFLP analysis of the ND2 gene as undertaken here, are required. Such should provide important new information for the conservation of genetic divergence in the Kanto region.

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Assessment of recreational fishing impact on the Biwa salmon resource based on redd abundance at ten Lake Biwa inlet streams in 2015

Masanori Oda and Taiga Yodo

Abstract Biwa salmon, an endemic species and important fishery resource in Lake Biwa, migrate upstream from the lake in inlet streams during the spawning season. Monitoring the number of spawning redds in such inlet streams can provide an assessment of the Biwa salmon population, similar population assessments having been conducted for Bull trout (North America) and Sakhalin taimen/Masu salmon (Hokkaido, Japan).

Numbers of recreational fishermen targeting Biwa salmon began to increase around 2006, becoming especially significant over the past four years. However, the potential negative impact of such on the Biwa salmon resource is a concern. To assess the current impact of fishing on Biwa salmon, spawning fish abundance and total redd counts of the latter in ten Lake Biwa inlet streams during 2015 were compared with the results of a previous study conducted in 2008, when recreational fishing was practiced on a smaller scale. Although spawning varied in each stream, the total redd count was comparable (1,066 in 2008 vs. 1,159 in 2015), indicating little impact on Biwa salmon resources due to the recent increase in recreational fishing pressure. Comparisons of the body sizes of mature fish showed no significant difference in average body size between 2009 and 2015, a further indication of relatively low fishing impact. It was concluded, therefore, that the increase in recreational fishing has had little effect on the Biwa salmon populations, likely due to the Shiga Prefecture initiatives to introduce early regulation of recreational fishing, as well as the common practice of most recreational fishermen to

practice “catch and release”.

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Microhabitat use by the endangered Itasenpara bitterling *Acheilognathus longipinnis* (Cyprinidae) during the spawning season in the Moo River, Toyama, Japan

Masaki Nishio, Tomonori Kawamoto, Ryosuke Kawakami, Yasuyuki Hata, Kaneaki Edo and Yuji Yamazaki

Abstract The Itasenpara bitterling *Acheilognathus longipinnis* is a small Japanese cyprinid fish distributed on plains in the Toyama, Noubi and Osaka regions. Because populations of the bitterling have been declining, the species has been recognized as “threatened” in the 2016 IUCN Red List and included as a critically endangered species in the Red List of Threatened Fishes, compiled by the Ministry of Environment of Japan. Because an understanding of the reproductive ecology of the species, especially spawning habitat, is essential for future conservation of Itasenpara bitterling, observations were conducted during the spawning season in the Moo River (Himi City, Toyama Prefecture, Japan), so as to clarify the utilisation of host mussels and determine the appropriate microhabitat for spawning. Many reproductive groups were found in both lotic and lentic environments. Whereas spawning individuals often selected microhabitats of water depth 200–300 mm and current velocity <25 mm/s, non-reproductive groups were found only in the lentic environment, where both school formation and feeding behaviour were observed. Feeding occurred mainly in microhabitats of water depth 500 mm and current velocity <25 mm/s. Thus, the observations indicated that Itasenpara bitterling in the Moo

River require shallow and deeper water microhabitats as spawning and feeding grounds, respectively.

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First specimen-based records of the Blackcheek Moray *Gymnothorax breedeni* from Yonaguni-jima island, Japan

Keita Koeda and Yuichi Akita

Abstract The genus *Gymnothorax* Bloch, 1795, a highly speciose group belonging to the family Muraenidae, currently comprises 126 valid species from tropical to temperate areas. Most of the 37 species already reported from Japanese waters are distributed in southern Japan, the Ryukyu Archipelago and the Ogasawara Islands. The genus is characterized by its tubular anterior nostril, located anteriorly on the snout tip, and almost equal tail and preanal lengths. Three specimens (534.0–920.0 mm total length) of the Blackcheek Moray *Gymnothorax breedeni* were collected concurrently in 7 m depth off Yonaguni-jima island, southern Ryukyu Archipelago, Japan. The species has previously been recorded from the tropical Indo-Pacific from eastern Africa to French Polynesia. The collected specimens were characterized by the following combination of characters: body moderate; anus slightly before middle of body; posterior nostril in upper position; single teeth row on jaws; teeth absent on vomer; black patch extending as a prominent slash to a point just behind corner of mouth; gill opening in a black spot. Although the species has been previously photographed underwater in the same locality, the specimens collected from Yonaguni-jima island represent the first specimen-based records from Japan. The new Japanese standard name “Hachimonji-utsubo” is proposed for the species. Formerly, the northernmost record of the species on the basis of collected specimens was

Palau, those reported here representing a ca. 2,200 km northward range extension.

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First Japanese record for a species of *Pseudoscopelus* (Acanthopterygii: Chiasmodontidae) lacking discrete photophores

Fumihito Tashiro

Abstract A single specimen (121.5 mm in standard length) belonging to the genus *Pseudoscopelus* was collected off the Pacific coast of Tohoku region, Japan. The specimen was unique among *Pseudoscopelus* inhabiting Japanese waters in completely lacking discrete photophores. Although identification was uncertain, primarily due to the taxonomic confusion among species lacking discrete photophores, the specimen was provisionally identified as *Pseudoscopelus vityazi* Prokofiev and Kukuev, 2007, based on the following characteristics: silver-colored structures present on head and body instead of discrete photophores, and internal area of orobranchial chamber dark, at least posteriorly. Although the original description indicated that the silver-colored structures were “luminescent tissue”, whether or not those structures are true luminescent organs still requires verification. A subsequently revised publication date (2008) for *P. vityazi* is discussed. The new standard Japanese name “Ginsen-kurobozugisu” is proposed for the species.

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Distribution of *Anguilla japonica* and *A. marmorata* in the Nansei Islands, Japan, and their habitat segregation based on local names

Yuichi Kano, Tomomi Yamashita, Wataru Tanaka, Akihiko Koyama and Kazuki Kanno

Abstract The current distribution of the Japanese eel *Anguilla japonica* and giant mottled eel *A. marmorata* were surveyed in 1120 inland water bodies on mainland Kyushu and the Nansei Islands, southern Japan. *Anguilla japonica* occurred at 8 and 2 sites on Kyushu and the Nansei Islands, respectively, the low catch rate apparently reflecting its cryptic life style. The likelihood of occurrence of *A. japonica* in stream habitats on the Nansei Islands was significantly lower than on mainland Kyushu. *Anguilla marmorata* occurred at 46 sites (mostly streams) on the Nansei Islands. Accordingly, low stream occurrence of *A. japonica* on the Nansei Islands may have resulted from interspecific competition. An informal verbal survey of 359 local respondents indicated that *A. japonica* had formerly been plentiful in Nansei Islands paddy fields, although a similar survey on mainland Kyushu found the habitat of *A. japonica* to be streams, rivers and/or estuaries. Local names of *A. japonica* on the Nansei Islands, including “paddy-dwelling eel” and “mud-dwelling eel”, also indicated adaptation of *A. japonica* to a paddy environment, the use of “stream-dwelling eel” for *A. marmorata* further suggesting habitat segregation of the two species. The paddy environment appears to be the primary habitat of *A. japonica* on the Nansei Islands. However, such paddy fields have decreased significantly in extent due to a recent crop change to millet. Restoration of the paddy environment is essential for future *A. japonica* conservation on the Nansei Islands.

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Notes

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A rare snailfish, *Liparis bikunin*, collected from Iwate, Japan

Yoshiaki Kai and Tsutomu Noda

Abstract A single mature female specimen of the rare snailfish *Liparis bikunin* Matsubara and Iwai, 1954 was collected from a scallop aquaculture ground in Miyako, Iwate, Japan. The specimen, representing the southernmost record and second overall of the species, is described in detail, including the proximal pectoral radials. The species has been incorrectly characterized as having the anus closer to the anal-fin origin than to the pelvic disk in previous descriptions.

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An early specimen of *Silurus lithophilus* (Siluriformes: Siluridae) found in the Natural History Museum, London

Yusuke Hibino

Abstract A single specimen of the catfish, *Silurus lithophilus* (Tomoda, 1961), was found in the collection of the Natural History Museum, London. The catalog number of the specimen (BMNH 1910.6.30.18) indicates that it was registered on 30 June 1910, long before the collection of the holotype of *S. lithophilus* (April 1961), previously believed to be the first collected example of the species. Accordingly, the Natural History Museum specimen represents the oldest known example of the species. It is inferred that

the specimen was collected during the 6th collecting survey of Mr. Richard Gordon Smith (from November 1905 to mid 1907), the precise date not being apparent in his excerpted diary published by Ms. Victoria Manthorpe. The collection locality of the specimen was noted as Kyoto on the jar label and in the museum collection database. However, a personal tag attached by Mr. Gordon Smith noted its collection from Lake Biwa. Apparently, the specimen was purchased at Kyoto after having been originally collected at Lake Biwa.

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