Papers Published in *Japanese Journal of Ichthyology*

Vol. 57, No. 2 November 5, 2010

CONTENTS

Full Papers

Short Reports

Full Papers

Japanese Journal of Ichthyology

Vol. 57, No. 2, pp. 93–103

Ultrastructural aspects of the sperm and spermiogenesis in two species of paedomorphic gobioid fishes (*Shindleria* sp. and *Leucopsarion petersii*)

Masako Hara, Shigeo Nakamura, Tadashi Kitano and Nobuhiko Akiyama

Abstract Ultrastructural observations of spermiogenesis in two paedomorphic gobioid fishes, *Schindleria* sp. and *Leucopsarion petersii*, were discussed with special reference to the specialized morphology of their spermatozoa. In *Schindleria* sp., spermiogenesis was characterized by (1) apical vesicle generated from nuclear section and surrounded by cytoplasm, (2) flagellum implanted to centriole at base of nucleus, moving towards apical vesicle by piercing nucleus center to beyond nucleus tip, (3) apical vesicle spermatozoon subsequently disappearing, (4) nucleus of mature spermatozoon cylindrical, 3.2 μm in length and ca. 0.5 μm in width, (5) flagellum fully penetrating nucleus, resulting in sperm length equaling flagellum length and (6) single

mitochondrion located at base of flagellum in contact with posterior end of nucleus. In *Leucopsarion petersii*, spermiogenesis was characterized by (1) a mass of small vesicles at nucleus tip forming apical point, (2) elongated apical point based on four rounded corners on top of ovoidal nucleus, (3) two centrioles located on basal body of nucleus, each with a typical flagellum, (4) both flagella with 9+2 axoneme pattern and (5) mitochondria varying in size and shape coalesce into a long midpiece. The spermatozoa of both species bear extremely specialized structures, such as the apical vesicle and the apical point, not yet reported in other teleosts. These structures are likely to have evolved within the less restricted framework of sperm morphology of gobioids, as reflected in the unusually high species diversity of this group.

(Corresponding author: Masako Hara, Atmosphere and Ocean Research Institute, University of Tokyo, 5–1–5, Kashiwanoha, Kashiwa, Chiba, Japan; e-mail: mhara@aori.u-tokyo.ac.jp)

Japanese Journal of Ichthyology

Vol. 57, No. 2, pp. 105–112

A distinctive allotetraploid spined loach population (genus *Cobitis*) from Tango District, Kyoto Prefecture, Japan

Makoto Takeno, Shohei Kashiwagi and Tadao Kitagawa

Abstract Morphological and genetical analyses revealed a spined loach population from Tango District, Kyoto Prefecture, to be an allotetraploid form of *Cobitis striata*. The former had distinctive differences in body coloration and mitochondrial DNA sequences from another allotetraploid form of *Cobitis striata*, found in Lake Biwa, and is tentatively termed the ‘Tango tetraploid form’ of *C. striata*.

(Corresponding author: Tadao Kitagawa, Graduate School of Agriculture, Kinki University, 3327–204 Nakamachi, Nara 631–8505, Japan; e-mail: tkitagaw@nara.kindai.ac.jp)

Japanese Journal of Ichthyology

Vol. 57, No. 2, pp. 113–123

Distribution and habitats of *Carassius auratus* in the Ryukyu Archipelago: comparisons between indigenous and introduced populations

Mikumi Takada, Katsunori Tachihara and Mutsumi Nishida

Abstract *Carassius auratus* in the Ryukyu Archipelago includes both indigenous and introduced populations which can be discriminated from each other by mitochondrial DNA (mtDNA) haplotyping. From the distributional survey of *C. auratus* in 81 waters on 15 islands of the Ryukyus, a total of 485 individuals were observed from 38 waters of 11 islands. MtDNA haplotyping of those individuals revealed that they are composed of 254 (52%) indigenous and 231 (48%) introduced individuals. Indigenous specimens were widespread throughout the Ryukyus and mainly inhabited the natural waters. On the other hand, introduced specimens were sporadic and mainly inhabited the artificial waters, especially in the reservoirs. Ploidy examination by flow cytometry showed that indigenous populations are composed of only diploids or diploids and triploids, whereas introduced populations are often consisted of only triploids. The fact that *C. auratus* could not be found in some islands where once their presence was confirmed suggested the possibility of recent decreasing of *C. auratus*, implying the importance of conservation of Ryukyuan indigenous *C. auratus*.

(Corresponding author: Mikumi Takada, Atmosphere and Ocean Research Institute, University of Tokyo, 5–1–5, Kashiwanoha, Kashiwa, Chiba, Japan; e-mail: takada@aori.u-tokyo.ac.jp)

Japanese Journal of Ichthyology

Vol. 57, No. 2, pp. 125–134

Two genetic clades in populations of *Paramisgurnus dabryanus*, an exotic invader in Ehime Prefecture

Takaaki Shimizu and Motohiro Takagi

Abstract Variations in genetic and morphological characteristics were investigated in two populations of the exotic pond loach, *Paramisgurnus dabryanus*, which has invaded rice fields in Kuma-kougen Town, Ehime Prefecture. A sequence analysis of the mitochondrial DNA control region of 46 individuals collected from two sampling sites (Higashi-myoujin and Koudono, separation distance 1.6 km) revealed two divergent clades (average nucleotide divergence: 15%) representing separate introductions: Group 1 (four haplotypes), related to *P. dabryanus*, and Group 2 (two haplotypes), related to *Misgurnus anguillicaudatus*, as a result of mitochondrial DNA introgression. In 29 of the 46 specimens, which included individuals of both genetic clades, four of 13 morphological characteristics (relative to body size) (head length, pre-pectoral length, dorsal fin base length and caudal peduncle depth) differed significantly (ANOVA, df=28, $P < 0.01–0.05$) between populations, but not between genetic clades. Haplotype constitutions differed significantly between sampling sites (exact test, $P < 0.001$), diversities being greater in Koudono which is located downstream of Higashi-myoujin. The existence of genetically divergent clades among the specimens suggested that the early introductions of this species to Japan originated from several localities.

(Corresponding author: Motohiro Takagi, Tarumi Branch, South Ehime Fisheries Research Center, Ehime University, Tarumi, Matsuyama, Ehime 790–8566, Japan; e-mail: takagi@agr.ehime-u.ac.jp)

Japanese Journal of Ichthyology

Vol. 57, No. 2, pp. 135–142

Paddy field drainage ditch preference by spawning round crucian carp (*Carassius auratus grandoculis*)

Toshiaki Mizuno, Taisuke Ohtsuka, Shigefumi Kanao, Masahiro Ogawa, Toshinori Funao and Masayoshi Maehata

Abstract Environmental factors affecting the preference of branch drainage ditches by round crucian carp (*Carassius auratus grandoculis*), a Lake Biwa endemic subspecies, were analyzed, fish often ascending to paddy fields, via drainage ditches, for spawning. A logistic regression analysis to determine factors influencing, drainage ditch selection showed dissolved oxygen to be significant, whereas turbidity and water velocity were not. Nevertheless, differences in distribution between ditches selected or not selected for spawning suggested that greater water velocity and moderate turbidity were also important factors.

(Corresponding author: Toshiaki Mizuno, Lake Biwa Museum, 1091 Oroshimo, Kusatsu, Shiga 525–0001, Japan; e-mail: ecoriskjp77@yahoo.co.jp)

Short Reports

Japanese Journal of Ichthyology

Vol. 57, No. 2, pp. 143–148

Genetic population structure of the Itasenpara bitterling, *Acheilognathus longipinnis*, in the Toyama and Osaka regions

Yuji Yamazaki, Tomomi Nakamura, Masaki Nishio and Kazuhiko Uehara

Abstract In order to establish a feasible conservation program for the Itasenpara bittering (*Acheilognathus longipinnis*), the genetic population structure was determined on the basis of five microsatellite loci for wild and captive populations from Himi City, Toyama Prefecture, and the Yodo River system, Osaka Prefecture. An endemic genetic

feature was found in each of the Toyama and Osaka regional populations, indicating that each should be treated as a separate unit in any future conservation program. The degree of genetic diversity in the Toyama populations tended to be lower than that in the Osaka population, being related to the population size and/or population demography. In the Toyama region, captive populations showed an equal degree of genetic diversity as the wild populations, probably due to a relatively short period of captive breeding as well as continuing introductions of wild individuals.

(Corresponding author: Yuji Yamazaki, Graduate School of Science and Engineering for Research, University of Toyama, 3190 Gofuku, Toyama 930–8555, Japan; e-mail: yatsume@sci.u-toyama.ac.jp)

Japanese Journal of Ichthyology

Vol. 57, No. 2, pp. 149–153

Host mussel utilization by bitterling (Cyprinidae, Acheilognathinae) in a drainage ditch near Lake Kasumigaura, Japan

Jyun-ichi Kitamura and Takahiro Morosawa

Abstract Bitterling are fishes that use freshwater mussels for oviposition. Mussel utilization by an endangered bitterling species, *Acheilognathus tabira erythropterus,* and an exotic species, *Rhodeus ocellatus ocellatus*, both of which spawn in spring, were investigated in a lowland river. Twenty nine freshwater mussels *Unio douglasiae nipponensis* (Unioninae) (63% of 46 individuals examined) hosted *A. t. erythropterus* eggs and embryos, mainly in their inner gills. One *U. d. nipponensis* (2.1%) and 2 *Anodonta* sp. (Anodontinae) (100%) hosted *R. o. ocellatus* eggs and embryos. The different mussel species utilized by the two bitterling may be important for their continued coexistence.

(Corresponding author: Jyun-ichi Kitamura, Toho University, 2–2–1 Miyama, Funabashi, Chiba 274–8510, Japan; e-mail: kitamura@bio.sci.toho-u.ac.jp)

Japanese Journal of Ichthyology

Vol. 57, No. 2, pp. 155–159

First record of the diretmid fish *Diretmoides veriginae* from the East China Sea, Japan

Makoto Okamoto and Koichi Hoshino

Abstract Two specimens of the diretmid fish *Diretmoides veriginae* Kotlyar, 1987 (138–175 mm in standard length) were collected by bottom trawl (depth 428–558 m) from the East China Sea, Japan. The species is characterized by the following combination of characters: postanal scutes present, spines absent on dorsal and anal fin bases, posterior ends of pectoral fins just reaching to above anal fin origin, total gill rakers 21–24. The specimens represent the first Japanese record and northernmost record of the species.

(Corresponding author: Makoto Okamoto, Seikai National Fisheries Research Institute, 1551–8 Taira-machi, Nagasaki 851–2213, Japan; e-mail: okamako@affrc.go.jp)

Japanese Journal of Ichthyology

Vol. 57, No. 2, pp. 161–166

Winter distribution pattern of Japanese eight-barbel loach in a conservation pond supplied with pumped groundwater

Takumi Moriyama, Wataru Kakino and Masakazu Mizutani

Abstract The winter distribution pattern of Japanese eight-barbel loach *Lefua echigonia*, in a controlled groundwater input conservation pond, varied with changes in input the position, the loach population showing aggregated dispersion. The distribution pattern, apparently dependent upon groundwater-inflow, was shown by multiple regression analysis to be strongly influenced by water temperature. Aggregation of the loach at groundwater-inflow sites that were warmer than elsewhere in the pond may indicate avoidance of low winter water temperatures, illustrating the importance of

spring water for this loach in the winter season.

(Corresponding author: Takumi Moriyama, Advice Center for Rural Environment Support, Fujistar Bldg. 2F, 11–8 Nihonbashi-Oodenmacho, Chuo-ku, Tokyo 103–0011 Japan; e-mail: t-moriyama@acres.jp)

Japanese Journal of Ichthyology

Vol. 57, No. 2, pp. 167–172

Rediscovery of *Ilyophis nigeli* (Anguilliformes; Synaphobranchidae) from northern Japan

Fumihito Tashiro, Hisashi Imamura and Mamoru Yabe

Abstract Ninety-nine synaphobranchid specimens, collected from Japanese waters between Hokkaido and Fukushima Prefectures, were identified as *Ilyophis nigeli* Shcherbachev and Sulak in Sulak and Shcherbachev, 1997 on the basis of the following combination of characters: body scaled; 5 or 6 supraorbital pores; 1 or 2 frontal pores; 140–152 total vertebrae; 80–113 total lateral line pores, lateral line ending well anterior to tip of tail; and gill slits horizontal or slightly oblique. Originally described from nine specimens collected from the Pacific slope off Japan, the species, which has been overlooked by Japanese ichthyologists, is redescribed on the basis of the newly-collected specimens. A new standard Japanese name, "Yuki-hora-anago", is proposed for the species.

(*Corresponding author: Fumihito Tashiro, Chair of Marine Biology and Biodiversity (Field of Systematic Ichthyology), Graduate School of Fisheries Science, Hokkaido University, 3–1–1 Minato-cho, Hakodate, Hokkaido 041–8611, Japan; e-mail: tashiro@fish.hokudai.ac.jp)*