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Original Papers

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First northwestern Pacific record of *Thysanophrys randalli* (Teleostei: Platycephalidae) from Kochi Prefecture, Japan and morphological comparisons with *T. chiltonae*

Hiroyuki Motomura*, Jumpei Taguchi, Hisashi Imamura and Mizuki Matsunuma

Abstract During an ichthyofaunal survey of southern Japan, a single specimen (74.9 mm standard length; SL), collected at a depth of 8 m off Kashiwa-jima Island, Kochi Prefecture in June 1992, was found in the fish collection of the National Museum of Nature and Science, Tsukuba, Japan. The specimen was subsequently identified as a species of *Thysanophrys* Ogilby, 1898, having the following combination of characters: dorsal surface of head lacking tubercles, suborbital ridge with six distinct spines (including one preorbital spine), lateral-line scales with two exterior openings posteriorly, ocular papillae absent, interopercular flap absent, and well developed sensory tubes on upper cheek region. The specific identification as *T. randalli* Knapp, 2013 was based on the short snout (length 10.1% of SL), a single preocular spine, no supraocular tentacles, the iris lappet without branches, interopercle expanded posteroventrally, and six scale rows between the second dorsal-fin origin and lateral line. *Thysanophrys randalli* having been recorded previously only from the western Indian Ocean and Pacific Ocean north to Kiribati, the Kochi specimen represents the first northwestern Pacific (including Japanese waters) and northernmost records of the species. The species is compared in detail with the closely related congener *Thysanophrys chiltonae* Schultz, 1966. In Japanese waters, both species occur around the southern oceanic islands. The new standard Japanese name “Kokuchikuroshimagochi” is proposed for *T. randalli* (“Kuroshimagochi” applied to *T. chiltonae*).

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Personality differences in white-spotted char fry evident between habitats

Ryota Hasegawa*, Hiroyuki Yamada, Chiaki Ishihara and Satoshi Wada

Abstract Animal personality, defined as consistent individual differences in behavior across time and/or context, has been associated with individual dispersal tendencies in some species. White-spotted char (*Salvelinus leucomaenis*) populations, often found in above-dam watersheds in Japanese mountain streams, the dams preventing continuous distribution with lower stream reaches, were subject of a behavioral study comparing above-dam and open-stream behavior of fry. Fries were collected from an above-dam area and two open-stream areas within the Kame River system (southern Hokkaido), and personality quantified by measuring a suite of behaviors, such being repeated two-month later. Above-dam fry showed a shorter swimming duration against a novel object and mirror than

open-stream fry. The latency time to catch food in above-dam fry tended to be longer than that of the latter. Swimming duration against a novel object and mirror were significantly correlated when data for both groups combined, but not so when data for each group were analyzed independently. These results suggest that personality traits in white-spotted char fry would be shaped by natural selection acting on each habitat, resulting in differing adaptive personality traits.

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First record of the longfin dragonfish, *Bathophilus longipinnis* (Stomiidae; Melanostomiinae), from Japan

Akinori Teramura*, Keita Koeda, Naomitsu Suzuki, Shotaro Hirase and Hiroshi Senou

Abstract A single specimen (124 mm in standard length) of the genus *Bathophilus*, trawled from 300 m in Suruga Bay, Japan on 30 January 2019, was identified as *Bathophilus longipinnis* (Pappenheim, 1914), being characterized by the following combination of characters: bases of pelvic fins equidistant between dorsal and ventral profiles; pectoral-fin rays 8; pelvic-fin rays 10; ventral row of photophores from tip of isthmus to anal-fin origin 32; large lateral series photophores 25; vertebrae 45 (previously recorded range 40–44); head length 17.3% in standard length (18.0–25.0%); body depth at origin of dorsal fin base 14.3% in standard length. The circumglobal (Atlantic Ocean; Indian Ocean; southern Pacific Ocean: Australia; Central Pacific: Hawaiian Islands; western Pacific Ocean: South China Sea) species has been previously recorded from the Kuroshio Current basin (20–38°S, 138–152°E), although the detailed collection locality was not stated. There being no other records from Japanese waters, the specimen from Suruga Bay represents the first unequivocal record of *B. longipinnis* from Japan. The new standard Japanese name “Amanogawa-gingaeso” is proposed for the species.

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First reliable records of *Epinephelus craigi* (Perciformes: Serranidae) from Japan and the southern South China Sea, and a note on the standard Japanese name proposed for *E. stictus*

Yuri Suzuki, Hiromitsu Endo, Hiroyuki Motomura, Hiroshi Senou and Mizuki Matsunuma*

Abstract Serranid specimens collected from Tosa Bay, Kochi Prefecture, Japan (1 specimen) and the South China Sea [Gulf of Tonkin, off Vietnam, Riau Islands (Indonesia) and Borneo] (10 specimens) were identified as *Epinephelus craigi*, previously been known

only from Taiwan and China. The species is characterized by five dark vertical bands bisected by a longitudinal series of squarish blotches on the body, numerous small black spots scattered on the lateral and dorsal portions of the head and anterior body, a longitudinal dark band behind the eye and on the upper opercle, the soft-rayed portion of the dorsal fin, anal and caudal fins without black margins, 46–57 pored lateral-line scales, and 81–95 longitudinal series scale rows. Previous Japanese records of *Epinephelus stictus* Randall and Allen, 1987 (now restricted to Australia and Indonesia) and *Epinephelus diacanthus* (Valenciennes in Cuvier and Valenciennes, 1828) (northern Indian Ocean) are considered to have been misidentifications. The present specimens represent the first specimen-based records of *E. craigi* from Japan and the southern South China Sea (Vietnam, Riau Islands and Borneo). The new standard Japanese name Sumitsuki-aohata is proposed for *E. craigi*. The standard Japanese name Aohata-modoki should be applied for *E. stictus*.

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Genetic population structure of *Cobitis minamorii tokaiensis*

Gen Ito*, Yasunori Koya, Tokumasa Horiike and Takahiko Mukai

Abstract An examination of the genetic population structure of *Cobitis minamorii tokaiensis* in central Honshu Japan, based on mitochondrial DNA nucleotide sequences in the cytochrome *b* region, revealed that the subspecies is subdivided into three regions (West-Shizuoka, Mie, and Aichi-Gifu) on the evidence of haplotype distribution and pairwise Φ_{st} among populations. However, the phylogenetic analyses indicated that the haplotypes in the three regions belong to the same haplotype group, suggesting that *C. m. tokaiensis* dispersed following the interconnection of paleo-river systems within relatively recent geological time, and subsequently differentiated in several areas. Because of its genetic characteristics, the three regions are important for conservation of the subspecies' genetic diversity.

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Multiplex PCR-based genotyping of mitochondrial DNA from two *Gnathopogon* species found in the Lake Biwa system: its development and application to field-collected eggs from the South Basin

Kohji Mabuchi*, Kazuya Nishida and Makoto A. Yoshida

Abstract The endemic Lake Biwa species *Gnathopogon caerulescens* has become severely endangered since the 1990s due to deterioration of its spawning habitat, much of which was in

the South Basin of the lake. To aid in the conservation of the species, a rapid molecular method was devised for discriminating it from a sympatric congener, *Gnathopogon elongatus*, widely distributed in western Japan. Three allele-specific primers were developed for the mitochondrial cytochrome *b* gene regions of three lineages of the two species: Cytb465hon_c for *G. caerulescens*, and Cytb315tam_e1 and Cytb246tam_e2 for the E1 and E2 lineages, respectively, of *G. elongatus*. Using the same reverse primer (Cytb522R), the specific primers for *G. caerulescens* and the E1 and E2 lineages of *G. elongatus* were designed to amplify ca. 80-, 230-, and 310-bp fragments, respectively. Multiplex PCR reactions including these four primers produced species/lineage-specific fragments. Although false fragments sometimes appeared, they did not affect discrimination between the two species. To demonstrate the efficacy of this method, field-collected eggs were analyzed, a total 1,238 eggs being collected from 37 egg populations on submerged roots of *Salix* trees (the spawning substrate preferred by *G. caerulescens*) on the coast of the South Basin between 18 April and 16 May 2019. Analysis of 298 eggs (approximately equal samples from each population) using a published DNA method resulted in 249 being successfully sorted into the genera *Gnathopogon* (206 eggs), *Carassius* (33), and *Cyprinus* (10). Subsequent analysis of the *Gnathopogon* eggs with our method detected 185 *G. caerulescens* and three *G. elongatus* (E1) eggs, 18 being unidentified. *G. caerulescens* eggs were included in 32 of the 37 egg populations from throughout the South Basin, except the southernmost region, indicating that the geographic distribution of spawning sites of the species is rapidly recovering to pre-1960s levels (based on literature estimates).

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First specimen-based Japanese record of *Oxycheilinus arenatus* (Perciformes: Labridae) from the Ryukyu Islands

Yuna Dewa, You Sakurai, Jumpei Nakamura and Hiroyuki Motomura*

Abstract The Indo-Pacific labrid genus *Oxycheilinus* Gill, 1862 includes 10 valid species, seven having been recorded from Japanese waters on the basis of collected specimens. A single specimen (157.8 mm standard length) of the Speckled Maori Wrasse *Oxycheilinus arenatus* (Valenciennes, 1840), collected from the Ryukyu Islands, Japan in March 2019, possessed the following characters: a large black basal blotch on the interspinous membranes between the first and fourth dorsal-fin spines; a distinct black longitudinal band from behind the eye to the caudal-fin base; and no black blotch on the body above the pectoral fin. Although widely distributed in the Indo-Pacific, except for the Hawaiian Islands, *O. arenatus* has been recorded in Japanese waters only from photographs and no Japanese specimens have been found in museum collections. To confirm the collected specimen's status as the first specimen-based Japanese record of the species, the seven congeners previously recorded from

Japan were re-examined. One of these, *O. oxyrhynchus* was recorded from Japan in 1897 on the basis of two specimens, with no further Japanese specimens reported. Examination of these specimens revealed them to be identical with *O. celebicus* (also previously recorded from Japan), although a modified illustration (based on original illustration of *O. oxyrhynchus*) reported as *O. oxyrhynchus* by subsequent Japanese publications is very similar to *O. arenatus* in overall body appearance. The Ryukyu specimen represents the first specimen-based record of *O. arenatus* from Japan. The new standard Japanese name “Hiromochinouo” is proposed for the species.

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First Pacific records of *Sphyraena arabiansis* (Perciformes: Sphyraenidae), with a revised species diagnosis and morphological comparisons with *S. barracuda*

Satoshi Morishita, Ryohei Miki, Hiroshi Senou and Hiroyuki Motomura*

Abstract Five large specimens (648.5–1162.9 mm standard length) of *Sphyraena arabiansis* Abdussamad and Retheesh in Abdussamad et al., 2015, previously known only from Lakshadweep, southeastern Arabian Sea, Indian Ocean, but recently collected from southern Japan (Kanagawa, Miyazaki, and Kagoshima prefectures) and off the south coast of New Caledonia, represent the first records of *S. arabiansis* from the Pacific Ocean. *Sphyraena arabiansis* is very similar to *S. barracuda* Edwards, 1771, both species sharing dark lateral body bars not extending onto the abdomen, whitish upper and lower caudal-fin tips, a pair of lobes on the caudal-fin central margin, and slightly elongated posteriormost rays of the second dorsal and anal fins. A re-assessment of currently recognized diagnostic characters of *S. arabiansis* confirmed scale row counts, branchiostegal membrane coloration, the presence or absence of body blotches, and location of body bars as valid for separating the two species. In addition, interorbital width and maxilla position distinguish between the species in specimens > 800 mm SL and 280 mm SL, respectively. Newly recognized diagnostic characters of *S. arabiansis* include numbers of total lateral-line scales, and upper and lower preopercular scale rows, and caudal-peduncle length. Revised diagnoses are given for *S. arabiansis* and *S. barracuda* and the new standard Japanese name “Yasha-kamasu” proposed for the former.

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Records of *Naso annulatus*, *N. brachycentron* and *N. lopezi* from the northern East China Sea and Sea of Japan

Yuki Tomimori, Akari Ogino, Yoshitaka Uchida, Yoshiaki Kai and Mizuki Matsunuma*

Abstract *Naso annulatus* Quoy and Gaimard, 1824 (Perciformes: Acanthuridae) is newly recorded from Fukue-jima Island (32°41'24"N, 128°45'14"E; Nagasaki Prefecture), northern East China Sea, Japan, based on single specimen [531.5 mm standard length (SL)]. In addition, *N. brachycentron* Valenciennes, 1835 (345.1 mm SL) and *N. lopezi* Herre, 1927 (453.9 mm SL) are both recorded from O-shima Island (34°30'30"N, 131°25'12"E; Yamaguchi Prefecture), Japan, each on the basis of a single specimen. The record of *N. brachycentron* is the first specimen-supported record of the species from the Sea of Japan. All three species are considered to be important evidence of adult (>300 mm SL) unicornfishes having been transported by the Tsushima Warm Current from a more southern region to the northern East China Sea and Sea of Japan.

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First Japanese record of the pufferfish *Takifugu flavidus* (Tetraodontiformes: Tetraodontidae), collected off Hagi, Yamaguchi Prefecture, Japan

Takayuki Sonoyama* and Keiichi Matsuura

Abstract *Takifugu flavidus* (Li, Wang and Wang in Cheng et al., 1975) has been treated as a Japanese species by previous Japanese authors, despite the lack of any specimen-based records of the species from Japanese waters. However, an example of *T. flavidus*, collected off Hagi, Yamaguchi Prefecture, Japan was recently found in the fish collection of the Hagi Museum, Yamaguchi Prefecture. The species is distinguished from all congeners by the following combination of characters: dorsal and ventral spinule-covered areas not connected; body dark brown with white spots dorsally; an elliptical black blotch edged with white behind the pectoral fin.

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Records of *Eustomias gibbsi* (Stomiiformes: Stomiidae: Stomiinae) from Japan

Jinpei Ishikawa, Shinpei Ohashi, Fumiya Tanaka, Hidetada Kiyofuji and Naohide Nakayama*

Abstract Six specimens (101–152 mm standard length, SL) of the dragonfish *Eustomias gibbsi* Johnson and Rosenblatt, 1971 were collected from off Okinotori-shima Island, Japan, at depths of 110–160 m. The species is distinguished from its congeners by the following combination of characters: pectoral fin well developed, with 3 soft rays; pelvic fin with 7 soft rays; no prominent midventral groove posterior to pectoral-fin bases; barbel lacking external pigment nor row of black spots; barbel length 24.9–52% SL; terminal bulb single, unbranched

basally, with black cap covering its base; terminal filament single, without bulbs or filaments; second mandibular teeth longer than first; and short posteriorly directed projection on anterior margin of fleshy orbit. Although one of the paratypes of *E. gibbsi* was collected within the Japan's EEZ, the record has been overlooked by subsequent Japanese authors. The new standard Japanese name "Kanmuri-hoshieso" is proposed for the species.

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Northernmost records of *Neamia notula* (Apogonidae) from Kushimoto, Wakayama Prefecture, Japan

Tomohiro Yoshida*, Kiyoshi Hagiwara and Hiroyuki Motomura

Abstract Six specimens (20.6–30.7 mm standard length) of the rare Indo-West Pacific Gillspot Cardinalfish, *Neamia notula* Fraser and Allen, 2001 (Apogonidae) were collected from a beach (after having been stranded following strong southerly winds) at Sabiura, Kushimoto, Wakayama Prefecture, Japan on 1 March 1982. Japanese examples of the species having been recorded only from Kashiwa Island (Kochi Pref.), Uchinoura Bay (Kagoshima Pref.), and Senaga, Okinawa Island (Okinawa Pref.), the Wakayama specimens represent the northernmost record of the species.

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Record of a snake eel, *Ophichthus sangjuensis* (Anguilliformes: Ophichthidae), collected from Osaka Bay, Japan

Yusuke Hibino* and Yuki Kimura

Abstract A single specimen (515.5 mm of total length) of a snake eel, *Ophichthus sangjuensis* (Ji and Kim, 2011), collected from Osaka Bay, eastern Seto Inland Sea, Japan, represents the second Japanese record and easternmost record of the species. Although the number of mandibular pores, one of the diagnostic characters of the species has been known as five, the present specimen has six on the left side and five on the right side. We consider the condition is an intraspecific variation.

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Records and comments on current settlement of *Microphis retzii* in Ishigaki and Iriomote Islands, the Ryukyu Islands, Japan

Shuya Kato*, Tomoaki Maruyama, Naoto Inui, Akihiko Goto, Toshiyuki Suzuki and Hiroshi Senou

Abstract Eighteen specimens of the pipefish *Microphis retzii* were collected from several rivers on Iriomote and Ishigaki Islands (Yaeyama Islands, Ryukyu Islands, Japan) from 1990 to 2019. The records from Iriomote Island, including variously sized specimens plus brooding males over multiple years, suggest established settlement of the species. The records from Ishigaki Island, being the first specimen-based records of the species from that locality, are suggestive of a new settlement. Accordingly, *M. retzii* should be treated as a Japanese resident species, rather than one subject to abortive migration, making them eligible for evaluation of red lists in Japan.

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Specimen-based records of *Cephalopholis polleni* (Perciformes: Serranidae) from Japan

Jumpei Nakamura, Ifue Fukuchi, Katsunori Tachihara and Hiroyuki Motomura*

Abstract Two specimens (227.8–251.7 mm standard length) of the rare grouper *Cephalopholis polleni* (Bleeker, 1868) were collected off Okinawa-jima and Ishigaki-jima islands, Ryukyu Islands, the species having previously been known from scattered insular localities in the Indo-Pacific Ocean, including the Ryukyu Islands between the Amami and Yaeyama Islands. Although a single specimen of *C. polleni* had been previously obtained from a fish market in Naha, Okinawa-jima Island, its capture locality was unknown and the specimen is now apparently lost. All other Japanese records of the species were based solely on photographs. Accordingly, the present specimens of *C. polleni*, described here in detail, from Okinawa-jima and Ishigaki-jima islands represent important specimen-based records of the species from Japan, being the first with precise locality data. A review of previous distribution records of *C. polleni* from Japanese waters is also provided.

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Fresh coloration and hyperostotic variations in *Pterygotrigla cajorarori* Richards and Yato, 2012 (Triglidae)

Takuji Yato*, Naohide Nakayama and Hiromitsu Endo

Abstract The original description of *Pterygotrigla cajorarori* Richards and Yato, 2012, based on eight specimens from the western Pacific Ocean, including one Japanese specimen, indicated hyperostosis in the rostral projection, head bones (infraorbital, frontal, and parietal),

post temporal spine, humeral spine, and the 2nd–4th first dorsal-fin spines, although variations in these characters were poorly documented. Thirteen specimens (including two paratypes) of *P. cajorarori* collected from southern Japan, the South China Sea, and Indonesia were found to vary individually in the degree of hyperostosis in the rostral projection, mesethmoid, lateral ethmoid, frontal, sphenotic, pterotic, and infraorbital bones, whereas the condition was not prominent in the parietal and posttemporal bones, or the humeral spines. However, hyperostosis was newly found in the 5th and 6th dorsal-fin spines and pelvic-fin spine. A detailed description of fresh coloration (previously unknown) in *P. cajorarori* is also given.

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