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First Japanese record of *Caulophryne polynema* (Ceratioidei; Caulophrynidae) collected from off Iwate Prefecture, Pacific coast of northern Japan

Ryo Misawa*, Yuto Suzuki and Yoshiaki Kai

Abstract The rarely collected ceratioid anglerfish family Caulophrynidae, including the genera *Caulophryne* Goode and Bean, 1896 and *Robia* Pietsch, 1979, is widely distributed from the surface to the bathypelagic zone in the Pacific, Atlantic and Indian oceans. Valid *Caulophryne* species, characterized by the absence of an expanded escal bulb, presence of only 2 pectoral radials, extremely long dorsal- and anal-fin rays, 8 caudal-fin rays, neuromasts of the acoustic-lateralis system located at the tips of elongate filaments, an illicial length less than 130% of standard length (SL), 14–22 dorsal-fin rays, and 12–19 anal-fin rays, include *Caulophryne Jordani* Goode and Bean, 1896 and *Caulophryne pelagica* (Brauer, 1902) from all three oceans, *Caulophryne polynema* Regan, 1930 from the Atlantic and eastern Pacific, and *Caulophryne bacescui* Mihai-Bardan, 1982 from the eastern Pacific. A single female specimen of *C. polynema*, collected over a bottom depth of 658–663 m off Iwate Pref., Pacific coast of northern Japan, on 9 October 2020, was distinguished from other congeners by the following combination of characters: illicium length 17.3% SL, with about 50 translucent filaments along its entirety; 19 dorsal- and 17 anal-fin rays. In addition, a parasitic male with degenerated dorsal, anal and pectoral fins, and eyes was found on the specimen. The specimen represents the first record of *Caulophryne polynema* from the western North Pacific, including Japanese waters, and northernmost record of the species in the Pacific Ocean. The new standard Japanese name “Fusafusa-hirenaga-chochin-anko” is proposed for the species.

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First record of *Ostorhinchus hartzfeldii* (Perciformes: Apogonidae) from Japan

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Abstract A specimen (39.1 mm standard length) of the genus *Ostorhinchus* Lacepède, 1802, collected from Ishigaki-jima Island, the Ryukyu Archipelago, southern Japan, was identified as *Ostorhinchus hartzfeldii* (Bleeker, 1852). The specimen showed characteristic coloration of the species, including the following features: four slightly wavy longitudinal silver lines on the head and body, the dorsalmost running along the dorsal body margin to the caudal fin base, and the others terminating on the trunk or caudal peduncle; the entire body base color brown; all fins slightly reddish, transparent; a dark spot on the caudal fin base, of similar size to the

pupil. *Ostorhinchus hartzfeldii* is similar to *Ostorhinchus cookii* (Macleay, 1881), *Ostorhinchus nigrofasciatus* (Lachner, 1953), and *Ostorhinchus taeniophorus* (Regan, 1908), but differs from them by having only the dorsalmost longitudinal silver line reaching the caudal fin base (vs. three or four lines reaching the fin base in the other three species) and absence of a longitudinal silver line on the ventrolateral aspect of the trunk (vs. present). *Ostorhinchus hartzfeldii* is distributed in the western Pacific, from the South China Sea to Australia, but had not previously been recorded from Japanese waters. A photographic record of the species from Ishigaki-jima Island is also included. The new standard Japanese name "Sazanami-ishimochi" is proposed, a reference to the slightly wavy silver lines that disappear with growth, based on the specimen collected from Ishigaki-jima Island.

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First Japanese record of a giant leptocephalus of *Congriscus maldivensis* (Anguilliformes: Congridae) collected off Kuro-shima Island, Osumi Islands, Kagoshima Prefecture, Japan. Japan

Kentaro Mochizuki, Masahide Itou and Hiroyuki Motomura*

Abstract A single specimen (153.7 mm total length) of large congrid leptocephalus, collected at a depth of 400 m off Kuro-shima Island, Osumi Islands, Kagoshima Prefecture, Japan, was subsequently identified as *Congriscus maldivensis* (Norman, 1939), having the following combination of characters: 46 lateral-line pores before anus; 149 total vertebrae, including 46 abdominal vertebrae; maximum body depth 27.2% of total length (TL); pectoral fin length 40.6% of head length; highest margin of head profile anterior to pectoralfin base; snout rounded, its tip anterior to tip of lower jaw; maxilla and mandibular teeth conical, uniserial; anterior nostril with short membranous tube, below snout margin; posterior nostril rounded, anterior to eye; posterior end of mouth posterior to vertical through middle of eye; cephalic sensory pores and lateral line developed; anus slightly anterior to middle of body; dorsal, anal, pectoral, and caudal fins present (dorsal-, anal-, and caudal-fin membranes fused); and dorsal fin origin slightly posterior to ventral through pectoral-fin base. A neighbor joining tree based on mtDNA cytochrome c oxidase subunit I (COI) gene sequences placed the specimen within a clade of *C. maldivensis*, based on previously published sequences, thereby supporting its conspecificity with *C. maldivensis*. The specimen was tentatively determined as a metamorphic larva, based on the following features: 153.7 mm TL, head length 12.7% of TL, and body opaque, with melanophores around the midline. An Indo-West Pacific species, *C. maldivensis* has previously been recorded from Tanzania to the Philippines, Wallis and Futuna Islands, and Australia, the present specimen therefore representing the first Japanese record and northernmost record of the species. The new standard Japanese name "Nan'you-okianago" is proposed for the species.

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First Japanese record of *Gymnothorax pseudoprolatus* (Anguilliformes: Muraenidae) from the west coast of Satsuma Peninsula, Kagoshima Prefecture

Yuna Dewa*, Masahide Itou and Hiroyuki Motomura

Abstract A single specimen [411.5 mm total length (TL)] of the Short-tail Brown Moray *Gymnothorax pseudoprolatus* Smith, Hibino and Ho, 2018 was collected at a depth of 27 m off Kasasa, Minami-satsuma, Kagoshima Prefecture, Japan. The specimen possessed the following characters: 75 pre-anal vertebrae; 175 total vertebrae; maxillary teeth biserial anteriorly and uniserial posteriorly; dentary teeth uniserial; 6 mandibular pores; head length (HL) 11.1% of TL; pre-dorsal length 8.6% of TL; body depth at gill opening 4.1% of TL; body uniformly brown; and lips whitish. Although *G. pseudoprolatus* is most similar to *Gymnothorax prolatus* Sasaki and Amaoka, 1991, it differs from the latter in having a longer pre-anal region (pre-anal length 50.0–53.6% of TL vs. 48–51% in *G. prolatus*), shorter snout (snout length 17.8–20.7% of HL vs. 20.0–23.8%), 6 mandibular pores (vs. 7), 75–78 pre-anal vertebrae (vs. 79–83), and 169–175 total vertebrae (vs. 182–187). In addition, analysis of the mitochondrial cytochrome oxidase I (COI) gene of both species showed them to be separated by 3.2–3.8% average sequence divergence. *Gymnothorax pseudoprolatus* has been previously known only from the holotype from Taiwan. Therefore the Kagoshima specimen represents the first record from Japanese waters and the northernmost record for the species. The new standard Japanese name “Chairo-utsubo” is proposed for the species.

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Developments of eggs, larvae, and juveniles of *Torquigener albomaculosus* in captivity and comparisons with other species in the family Tetraodontidae

Takayuki Sonoyama* and Hiromi Hata

Abstract *Torquigener albomaculosus* has been found at depths of 10–30 m on the southern coast of Amami-Oshima Island, Kogoshima Prefecture, and at 100 m off Hamahika-jima Island, Okinawa Prefecture. However, there have been no reports on the morphology and pigmentation of the larvae and juveniles. Eggs of *To. Albomaculosus* were collected from the southern coast of Kakeroma-jima Island, Kagoshima Prefecture, at a depth of 32 m, and development of eggs, larvae, and juveniles were observed in captivity. Comparisons were made with previous reports on the development of pufferfish species inhabiting Japan and adjacent seas. Eggs were 0.96 ± 0.02 mm (n = 20) in size, spherical in shape, colorless, transparent, demersal, and adhesive. Immediately after hatching, larvae were 2.43 ± 0.08 mm (n = 11) in total length and the number of myomeres was 8 + 11 = 19. Dendritic melanophores

were present on the dorsal surfaces of the head and body, dorsal and ventral sides of the abdominal cavity, but were absent from the caudal region. The mouth and anus had already opened but the yolk still remained. The yolk was absorbed within 2 days of hatching. At 19 days after hatching, ossification of teeth began in the upper and lower jaws. Simple small spinules appeared on the gill covers and abdomen. They were pointed at the distal end and not divided. Black melanophores were distributed from the snout to the region between dorsal- and anal-fin bases, absent from the caudal region. The larvae became juveniles 36 days after hatching. At 61 days after hatching, the sides and dorsal surface of the body were silver, the ventral surface was yellow, and the area covered by small spinules extended posteriorly beyond the dorsal and anal fins. The larvae and juveniles of *To. albomaculosus* can be distinguished from those of other pufferfishes inhabiting the waters around Japan by the absence of black melanophores on the caudal region, the distribution and development process of small spinules, and body color.

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Standard Japanese names for the species group of the genus *Anguilla* (Teleostei: Elopomorpha: Anguillidae)

Mari Kuroki*, Shun Watanabe and Katsumi Tsukamoto

Abstract Serious concern about the declining populations of the genus *Anguilla* and increasing related socioeconomic activities worldwide have led to a rise in the use of unauthorized Japanese names for members of this genus in various fields, as well as in academia. Therefore, it became important to clarify the standard Japanese names of all valid species and subspecies in the genus. Existing standard Japanese names for *Anguilla* species and subspecies were assessed, and new names proposed for some members, based on their geographical distribution and morphological characteristics, according to the nomenclature guidelines for standard Japanese fish names formulated by the Ichthyological Society of Japan in 2020. Standard Japanese names of three Japanese species and one subspecies were adopted from already-established names (*Anguilla japonica*, Nihonunagi; *A. marmorata*, Ō-unagi; *A. bicolor pacifica*, Nyūginia-unagi; *A. luzonensis*, Ugumaunagi); two Atlantic species were redefined (*A. anguilla*, Yōroppa-unagi; *A. rostrata*, Amerika-unagi); and the remaining eleven species and five subspecies were newly named (*A. bicolor*, Baikara-unagi; *A. bicolor bicolor*, Indo-baikara-unagi; *A. dieffenbachii*, Nyūjīrandoō-unagi; *A. australis*, Ōsutoraria-unagi; *A. australis australis*, Ōsutoraria-syōtofin-unagi; *A. australis schmidtii*, Nyūjīrando-syōtofin-unagi; *A. reinhardtii*, Ōsutoraria-rongufin-unagi; *A. celebesensis*, Serebesu-unagi; *A. borneensis*, Boruneo-unagi; *A. interioris*, Interia-unagi; *A. megastoma*, Porineshia-rongufin unagi; *A. obscura*, Porineshia-syōtofin-unagi; *A. bengalensis*, Bengaru-unagi; *A. bengalensis bengalensis*, Indo-bengaru-unagi; *A. bengalensis labiata*, Afurika-bengaru-unagi; *A. mossambica*, Mozanbīku-unagi).

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Monthly changes in distribution of the mudskipper *Periophthalmus modestus* on a mud bank along the Ariake Sea, Japan

Eriko Awau, Yu Yoshida, Gregory N. Nishihara and Atsushi Ishimatsu*

Abstract We demonstrate monthly changes in the distribution of a population of the mudskipper *Periophthalmus modestus* inhabiting a mud bank of the Fukushoe River, flowing into the Ariake Sea, Japan. During the reproductive season from June to midAugust, fish density observed on the surface during lowest spring tide decreased from the most landward quadrats toward the river channel, particularly where the bank inclination was steep (within 30 m from the water's edge). Males accounted for over 90% of individuals collected at the most landward sampling plot, 67 to 15% at the next three plots, and 0% at the most riverward plot, where only females were collected. During the non-reproductive season from September to November, fish density also decreased toward the river channel, with no fish confirmed at the river's edge. Although the percentage of males decreased from landward to riverward plots, the trend was less marked than during the reproductive season. Monthly sampling of fish on riprap at the time of highest spring tide showed females to be dominant (70–90% of total) from May to July, with juveniles appearing in July and becoming dominant (70–80%) in August to October. No fish occurred on the riprap from November to the end of January. These findings suggest that many females migrate with the tide for feeding at the water's edge, thereby achieving rapid ovarian development, whereas mature males remain near their territory and burrows. Reproductive burrows were most abundant in the area of stable daily periods of submersion and emersion (300 min and 400–500 min, respectively) throughout the tidal cycle, suggesting that a regular cycle of inundation and emersion is important for the successful reproduction of the species.

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Strong assortative mating in ninespine stickleback *Pungitius tymensis* demonstrated in no-choice mating trials between pairs of three congeneric species

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Abstract No-choice mating trials were conducted in three sympatric ninespine stickleback species (*Pungitius tymensis*, *Pungitius sinensis* and *Pungitius pungitius*) to elucidate the degree of assortative mating among them. *Pungitius tymensis* males had higher mating rates (95%) with *P. tymensis* females than with females of the other two species. However, *P. tymensis* females had the mating rates with heterospecific males was very low (0-4.5%). One

instance of mating between a *P. tymensis* female and *P. sinensis* male continued for 1293 seconds, the longest mating time observed in the trial. These findings demonstrated that *P. tymensis* females were strongly incompatible with heterospecific males. Conversely, *P. tymensis* males exhibited mating behaviour toward females of all three species, heterospecific mating occurring in 7 of 22 trials with *P. sinensis* females, and 6 of 17 trials with *P. pungitius* females. The median time of successful mating by *P. tymensis* males did not differ significantly between conspecific (median: 106 s, range: 25–1165 s) and heterospecific mating (*P. sinensis*: median: 40 s, range: 8–652 s; *P. pungitius*: median: 140 s, range: 22–835 s). Accordingly, *P. tymensis* males may potentially cross with females of the other species, as evidenced by reports of naturally occurring hybrid individuals of *P. tymensis* with the latter. The mating trials strongly suggested a behavioural context wherein introgression of mtDNA genes occurred from *P. sinensis* to *P. tymensis*.

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Notes

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Habitat use by 0+ year old Hotoke loach, *Lefua echigonia*, near springs in the Kako River system, Hyogo Prefecture, Japan

Shigeru Aoyama

Abstract Habitat use by 0+ year old Hotoke loach, *Lefua echigonia*, was investigated between May 2014 and October 2015 near springs in the Kako River system, Hyogo Prefecture, Japan. In May and June, individuals less than ca. 5 mm standard length, which were only a few days post hatching, occurred in essentially non-flowing puddles associated with the stream, spawning having most likely occurred in the former where the minimal water flow lowered the risk of being carried downstream. Subsequently, individuals which had remained in the puddles until reaching the benthic stage, migrated to the stream from July.

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A record of the domestic alien bitterling *Rhodeus smithii atremius* from the Chikusa River system, Hyogo Prefecture, Japan

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Abstract The rosy bitterling subspecies *Rhodeus smithii atremius* is reported from the Chikusa River system, Hyogo Prefecture, Japan, within the former natural range of the now apparently locally extinct subspecies *Rhodeus smithii smithii*. The former was identified on

the bases of morphological and mitochondrial DNA analyses, all six specimens examined having the same haplotype as an individual of *R. s. atremius* from the Chikugo River system, Saga Prefecture. A hybrid specimen of *R. s. atremius* and *Tanakia limbata* showed intermediate characteristics between the two species, and suggested competition between domestic and exotic bitterlings during spawning.

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Northernmost record of *Pempheris vanicolensis* (Perciformes: Pempheridae) from Kikai-jima Island, Amami Islands, Japan

Jumpei Nakamura*, Keita Koeda and Hiroyuki Motomura

Abstract During an ichthyofaunal survey of Kikai-jima Island, Amami Islands (middle region of the Ryukyu Archipelago), Japan, a single specimen (148.7 mm standard length) of the Vanikoro Sweeper *Pempheris vanicolensis* Cuvier, 1831 (Perciformes: Pempheridae), distributed in the western Pacific Ocean, was collected from the east coast of the island. In Japanese waters, *P. vanicolensis* has previously been recorded only from the Yaeyama Islands (southern Ryukyu Archipelago), being the northernmost record for the species to date. Therefore, the Kikai-jima specimen, described herein in detail, represents a ca. 430 km northward distributional range extension of *P. vanicolensis*.

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Current status and early life history of ayu *Plecoglossus altivelis altivelis* at the southern limit of their range in Japan

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Abstract Current status and early life history of amphidromous ayu *Plecoglossus altivelis altivelis* were studied on Yakushima Island, southern Japan. Although the subspecies had been previously confirmed as distributed in five rivers on the island (Nagata, Isso, Miyanoura, Anbo, and Kurio Rivers), environmental DNA analysis strongly suggested that the population densities were generally low, and that the Anbo River population had disappeared. Spawning of the population in the Kurio River, the southern distribution limit of the subspecies in Japan, occurred in November, primarily around mid-month. Individuals reached 21.3 mm body length 35 days after hatching, the main food items being calanoid copepods. Upstream migrating individuals were observed in early April, suggesting that they remained in estuarine and marine waters for almost four months.

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