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A record of *Tylerius spinosissimus* (Tetraodontidae) from Okinawa-jima Island, Japan

Keiichi Matsuura*, Eri Katayama and Tetsuo Yoshino

Abstract Seven specimens of *Tylerius spinosissimus* (Regan, 1908) were washed up by a typhoon onto a beach at Nakagusuku in Okinawa-jima Island on 17 August 1997. This species has been rarely collected, being known from only a few localities in the tropical Indo-West Pacific. In addition to the seven specimens from Okinawa-jima Island, eight specimens collected off northwestern Borneo in the South China Sea by TV Oshoro-maru in November 1973 were found in the fish collection of the Hokkaido University Museum, Hakodate. Examination of the 15 specimens have revealed that the species is distinguished from other pufferfishes by the following characters: dorsal-fin rays 9–11, anal-fin rays 6–7, pectoral-fin rays 15–17, body somewhat squarish in cross-section, snout short with dorsal surface dropping abruptly anterior to eye, nasal organ a short papilla with two nostrils, eye dorsally adnate only, ventrolateral skin fold absent, body anterior to anal-fin base densely covered by small spinules, dorsal and ventral lateral lines running on lateral surface of body; frontals broad across interorbit, almost completely covering dorsal surface of ethmoid; prefrontal strongly down-curved. A juvenile of *Tylerius spinosissimus* ca. 10 mm in total length was photographed at 1 m depth in Suruga Bay, on the west coast of the Izu Peninsula, Honshu, Japan, in November 2008. This small specimen was similar in color to adults of *T. spinosissimus*: the dorsal half of the body being brown with a dark brown blotch just behind the dorsal corner of the eye, the ventral half of body white, and all fins pale.

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Migration history of masu salmon *Oncorhynchus masou* in the Naka River, Tochigi, Japan, estimated from otolith Sr:Ca ratio analysis

Takatoshi Tsunagawa* and Kotaro Shirai

Abstract The migratory histories of individual masu salmon *Oncorhynchus masou* collected from the Naka River, Tochigi, Japan were clarified from otolith strontium (Sr) and calcium (Ca) concentrations using X-ray electron microprobe analysis. Mapping and line analysis indicated three migratory types of the species. In addition to the conventional types, such as freshwater resident and typical anadromous (spending one year in marine waters), a new migratory pattern of short marine term anadromous (remaining in marine waters for several months) was apparent. Detailed life histories of short marine term anadromous individuals were estimated from otolith Sr fluctuations and ageing, from both scale and otolith daily increments. Consequently, more than half of the Naka River population

was estimated to migrate to a marine environment upon reaching a total length of 178–252 mm (one year old) in December–January, thereafter staying in marine waters for approximately five months, before returning to the river in May–July at 345–463 mm total length. These findings may help establish an enhancement method for this species as a recreational fishery stock. Future investigations, including tagging, verification of age evaluation methods, and gene analysis are necessary to confirm the existence of the short marine term anadromous form.

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Ichthyofaunal changes in Lake Kitaura, eastern Japan, over the past 50 years

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Abstract Large-scale Japanese lakes support many fish species and abundant fisheries resources. However, long-term changes in the fish fauna of such lakes have not been fully investigated, despite recent significant anthropogenic impacts on associated ecosystems. Accordingly, the extensive native and non-native fish fauna of Lake Kitaura, a typical large inland-sea lake (36 km^2) in eastern Japan, was investigated based on specimens collected by the staff of Itako Hydrobiological Station, Ibaraki University from 1977 to 1997, plus data from previous studies conducted since the 1950s. In total, 83 species in 35 families have been recorded from the lake from the 1950s to the present decade. The analyses of long-term changes in fish species data since the 1960s demonstrated a sharp decrease in marine, estuarine and diadromous species due to an estuarine barrage (Hitachi River floodgate) established in 1973, the disappearance of nine red-list species (e.g., threatened and near threatened species) following various artificial environmental changes from the 1960s to 1980s, and an increase in introduced exotic and Japanese species after the 1980s.

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First Japanese records of the Redtail Scad *Decapterus kurroides* (Carangiformes: Carangidae), from Kumano-nada (Pacific coast of Mie Prefecture) and the East China Sea

Yumeka Takahashi, Makoto Okada, Daichi Sasaki, Hiroyuki Motomura and Seishi Kimura*

Abstract The carangid genus *Decapterus* Bleeker, 1851 is characterized by single finlets behind both the second dorsal and anal fins, no scutes along the anterior curved part of the lateral line, two low papillae on the shoulder girdle, and a well-developed adipose eyelid. Members of the genus are distributed in tropical to temperate areas of the Pacific, Indian and

Atlantic oceans, and are commercially important food fishes. Four species (*D. akaadsi* Abe, 1958, *D. kurroides* Bleeker, 1855, *D. smithvanizi* Kimura, Katahira and Kuriiwa, 2013 and *D. tabl* Berry, 1968), characterized by a red caudal fin, are included in the red-fin *Decapterus* group. In 2016 and 2018, three specimens [216–304 mm in standard length (SL)] of *D. kurroides*, previously recorded from the Red Sea and east coast of Africa to the east coast of Australia and the Philippines, were collected from Kumano-nada, Pacific coast of Mie Prefecture, Japan. Additionally, a single specimen (191 mm SL) collected from Japanese waters in the East China Sea (west of Kyushu) in 2006 was also identified as *D. kurroides*. The specimens represent the first records of the species from Japanese waters, the Kumano-nada specimens being the northernmost record for the species. *Decapterus kurroides* is the most similar to *D. akaadsi*, but differs from the latter in the following characters: scutes more numerous on the straight part of the lateral line (30–32 vs. 26–29 in *D. akaadsi*), longer head (head length 29.9–33.0% SL vs. 26.7–30.1%) and longer snout-anus distance (55.8–60.4% SL vs. 51.2–54.6%) [measurements for both species modified from Kimura et al., (2013)]. *Decapterus kurroides* is also distinguishable from *D. smithvanizi* and *D. tabl* by having fewer cycloid scales on the curved part of the lateral line (45–52 vs. 54–62 in *D. smithvanizi*, 61–72 in *D. tabl*) and a deeper body (body depth 23.4–27.2% SL vs. 19.4–22.5%, 16.6–23.0%). A new standard Japanese name “Kitsune-akaaji” is proposed for *D. kurroides*.

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Geographical variation in vertebral numbers of white-sppotted charr on Hokkaido Island, Japan

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Abstract Vertebral numbers in white-spotted charr (*Salvelinus leucomaenis*), collected from four streams and two lakes on Hokkaido Island, Japan, were significantly higher in fish from streams flowing into the Sea of Japan compared with those flowing into the Pacific Ocean, a result compatible with previous allozyme studies. White-spotted charr in Lake Shikotsu had the lowest number of vertebrae, possibly resulting from long-term isolation. The maximum difference in mean vertebral numbers among charr populations was 1.6, twice that observed in chum salmon *Onchorhynchus keta* and a possible reflection of the absence of hatchery programs that can lead to population mixing. It is likely, therefore, that regional genetic structures have been maintained in Hokkaido Island whitespotted charr.

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Spawning nests of six goby species in a newly-established fish-way on the Onga River estuary barrage

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Abstract A new fish-way, comprising variously-sized bed materials on a gentle slope, established on the Onga River estuary barrage was found to have 69 cobbles and boulders used as spawning nests of six goby species, including a threatened species, during the period from June 2013 to May 2014. Male body sizes were positively correlated with spawning substrate. In addition, wide salinity variations recorded over the fish-way during high tides on either side of spring tide were also implicated in goby spawning site selection.

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First record of *Gymnogobius macrognathos* on Akkeshi mud flat, Hokkaido, Japan and utilization of *Upogebia* major burrows

Yumi Henmi*, Ryutei Inui, Ryutaro Goto and Gyo Itani

Abstract Eight specimens of a threatened goby, *Gymnogobius macrognathos* (30.04–38.87 mm in standard length), were collected on a mudflat characterized by abundant burrows of *Upogebia major*, at Akkeshi, Hokkaido, northern Japan in August 2017. Because *G. macrognathos* specimens were collected directly from *U. major*burrows by suction pump, and were also collected with *U. major* by digging sediment exposed at low tide, it was concluded that *G. macrognathos* utilized *U. major* burrows on the tidal flat. *Gymnogobius mororanus* and an unidentified species of *Gymnogobius* also utilized *U. major* burrows. The presence of *G. macrognathos* at Akkeshi represents the northernmost record of the species in Japanese waters, the isolated population being *ca*. 500 km north of the main distributional range of the species along the Pacific coast of Japan.

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Height and horizontal distance of territorial attacks by ayu (*Plecoglossus altivelis altivelis*) were observed in aquaria

Haruo Honda* and Ryosuke Yamamoto

Abstract The height and horizontal distance of territorial attacks by ayu (*Plecoglossus altivelis altivelis*) were observed in aquaria. Territory holders responded towards intruders when approached to within 30–40 cm, chasing them for 40–100 cm. Such chases ceased *ca*.

30–40 cm from the bottom (in 50–100 cm water depth), indicating that territorial defense limits in water depths greater than 50 cm were about 30–40 cm (vertical distance) and 40–100 cm (horizontal distance).

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Increasing gill raker numbers in juvenile and young skipjack tuna (*Katsuwonus pelamis*)

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Abstract An increase in gill raker numbers in skipjack tuna (Katsuwonus pelamis) was observed during the development of juvenile and young stages (26–187 mm in standard length (SL)). Examination of 104 individuals showed obvious increments in number with growth, until 80–100 mm SL. Subsequently, numbers increased slowly (to 59 in the largest specimen), indicating that gill raker development in skipjack tuna is slower than in other scombrid fishes, such as Thunnus. However, gill raker numbers in juvenile and young skipjack tuna stages remain a useful taxonomic character.

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