

# Report on the specimens of the order Acipenseriformes deposited in the Department of Zoology, the University Museum, the University of Tokyo with comments on distribution and specimen collection status in Japan of some rare species in the order.

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## Abstract

The collection of the order Acipenseriformes deposited in the Department of Zoology, The University Museum, The University of Tokyo (ZUMT) comprises 11 specimens, including eight species of two families. Two holotypes of *Acipenser kikuchii* Jordan & Snyder, 1901 (ZUMT 946) and *Acipenser multiscutatus* Tanaka, 1908 (ZUMT 955) were registered in the collection, however the latter could not find during our investigation (only the original photographs of holotype were found). Further, some specimens of extinct species were discovered from the collection: *Psephurus gladius* (Martens, 1862) (ZUMT 25426), which was extinct, *Acipenser dabryanus* Duméril, 1869 (ZUMT 25427) which was extinct in the wild, and the only extant species, *Pseudoscaphirhynchus kaufmanni* (Bogdanow, 1874) (ZUMT 63411) of the genus *Pseudoscaphirhynchus* Nikolskii, 1900. In addition, the morphological characteristics of all the acipenseriform specimens in ZUMT are described briefly.

## Introduction

The order Acipenseriformes comprises two families, Acipenseridae Linnaeus, 1758 and Polyodontidae Lacépède, 1797, including six genera with 27 species known to date (Nelson et al. 2016). Unfortunately, *Psephurus gladius* in the genus *Psephurus* Günther, 1873 was certificated extinction (Zhang et al. 2020) and assessed the extinct (EX) category in the Red List by IUCN (Qiwei 2022a). Moreover, *Pseudoscaphirhynchus fedtshenkoi* (Kessler, 1872) in the genus *Pseudoscaphirhynchus* Nikolskii, 1900 is probably extinct (Zholdasova, 1997). All acipenseriforms live in fresh water for all or a part of their lifetime in the Northern Hemisphere (Nelson et al. 2016). Although no acipenseriforms live in Japanese waters at the present time, some species such as *Acipenser medirostris* Ayres, 1854, *Asipenser sinensis* Gray, 1835, *Acipenser schrenckii* Brandt, 1869 and *Huso dauricus* (Georgi, 1775) strayed into Japan.

The taxonomy of the genus *Acipenser* appears to be confused. Some scientists considered a population of *A. medirostris* in the western Pacific as *Acipenser mikadoi* Hilgendorf, 1892 based on its genetic difference in ploidy (Birstein and Bemis 1997). Nevertheless, two species are indistinguishable in morphology, and Shedlko (2017) regarded the differences as intraspecific. As a result, we consider *A. mikadoi* as a junior synonym of *A. medirostris* in this study.

All acipenseriform specimens of the fish collection preserved in the Department of Zoology, The University Museum, The University of Tokyo (ZUMT) were re-identified in the present study. Hence, we described them as primary data for future taxonomic studies on this group.

## Materials and Methods

Methods for taking counts and measurements generally follow Hubbs and Lagler (1949), dorsal scutes jointing head isn't counted following Takeuchi (1979) and confirmation of at least one diagnostic character. The standard lengths (SL) of all specimens were measured. Major parts of most specimens were also measured: dorsal-

fin rays (D), anal-fin rays (A), pectoral-fin rays ( $P_1$ ), pelvic-fin rays ( $P_2$ ), dorsal scutes (DS), lateral scutes (LS), ventral scutes (VS), gill raker, total length (TL), fork length (FL), head length (HL), trunk breadth, trunk height, eye diameter, pectoral-fin length, outer barbel, inner barbel, mouth width, snout to anterior nostril, snout to mouth, snout to eye, snout to dorsal-fin origin, snout to upper caudal-fin origin, snout to pectoral-, snout to pelvic-, and snout to anal-fin origins.

Species are arranged in alphabetical order by species name. Japanese or Chinese names were given in parentheses for local name and personal name when written in the specimen ledger or tags. In addition, the list contains the ZUMT number, SL, TL, FL, collection locality, collection date, collector or donator, and collection method when available, and remarks if needed. Each collection year and collector for some specimens was estimated by following Koeda et al. (2022).

Some specimens for comparison and reference posted in The Kyoto University Museum, Kyoto University, Kyoto City and Field Science Education and Research Center Kyoto University, Maizuru City (FAKU), Hagi Museum, Hagi City (HH), The Kagoshima University Museum, Kagoshima City (KAUM), Kitakyusyu Museum of Natural History and Human History, Kitakyusyu City, (KMNH), Kanagawa Prefectural Museum of Natural History, Odawara City (KPM), Shimonoseki Municipal Shimonoseki Aquarium, Shimonoseki City (Kaikyokan), and National Museum of Nature and Science, Tsukuba City (NSMT). The registration numbers of KPM are expressed as seven digits, including leading zeros, on the museum database, although leading zeros are omitted here.

### Collection of Acipenseriformes in ZUMT

Although ZUMT 955 is recognized as the large sized (2120 mm SL) holotype of *Acipenser multiscutatus*, it could not be found in the collection. In addition, this species has been regarded as a junior synonym of *A. schrenckii* since Lindberg and Legeza (1965), we newly concluded it as a junior synonym of *A. sinensis*. Fortunately, the original film photographs of ZUMT 955 were discovered from a digital archive collection of ZUMT, showing some diagnoses of *A. sinensis*. Further, we confirmed ZUMT 946 found in the collection as the holotype of *A. kikuchii*, which has been regarded as a junior synonym of *A. sinensis* (Takeuchi 1979). Our examination revealed that 11 specimens of eight acipenseriform species deposited in the collection: 9 specimens of five species of Acipenseridae; two specimens of two species of Polyodontidae.

ZUMT 25427 of *A. dabryanus* was caught from Chongqing (重慶), the Yangtze River in early twentieth century. However, this species is not currently observed in this area and considered as extinct in the wild (Qiwei 2022b). ZUMT 63413, also collected from the Yangtze River, is identified as *A. medirostris*, the first record in the East China Sea.

*Pseudoscaphirhynchus kaufmanni* is one of the extant species in the genus, and a single uncatalogued specimen of this species is discovered in the ZUMT collection and enrolled as ZUMT 63411; this specimen is probably considered a sole specimen in the genus *Pseudoscaphirhynchus* presently preserved in Japanese museum collections. In addition, ZUMT 25426 of *Psephurus gladius* from Yichang (宜昌) along the Yangtze River should also very rare in the Japanese collection, because, the species was certificated extinct and assessed the extinct (EX) category in the Red list by IUCN (Zhang et al. 2020; Qiwei 2022a).

**Acipenseridae** チョウザメ科  
*Acipenser* Linnaeus, 1758 チョウザメ属  
*Acipenser dabryanus* Duméril, 1869  
Yangtze Sturgeon チョウセンチョウザメ 达氏鲟

**ZUMT 25427** (Fig. 1): 256 mm SL, 316 mm TL, 274 mm FL, Chongqing (重慶), Yangtze River, China, donated by Earl of Tsugaru (津軽伯爵).

Countable characters: D 53; A 35;  $P_1$  61;  $P_2$  37; DS 13+1; LS 36; VS 12+2+2.

Proportional characters: head length 30.7% SL; trunk breadth 13.1% SL; trunk height 16.8% SL; eye diameter 7.1% HL; pectoral-fin length 15.5% SL; outer barbel 10% HL; inner barbel 8.6% HL; mouth width 25.2% HL;

snout to anterior nostril 10.6% SL; snout to mouth 17.3% SL; snout to eye 14.4% SL; snout to dorsal-fin origin 74.2% SL; snout to upper caudal-fin origin 89.9% SL; snout to pectoral-fin origin 64.5% SL; snout to pelvic-fin origin 28.9% SL; snout to anal-fin origin 78.5% SL.

Remarks: Although this specimen was enrolled as *Acipenser sinensis*, 鲟魚 (鯉) on the ZUMT specimen ledger, we re-identified to *A. dabryanus* in this study. The captured date is unknown; however, this specimen was probably registered before 1933 (Koeda et al. 2022). The caption written on the ledger is as follows: 表面癩病患者ニ髣髴セリトテ四川省ニテハ癩子魚トモ称ス, サレド清朝時代迄ハ皇帝ニ献上サレントテ鯉トモ云フ (This species called as “leprous fish” in Sichuan Province, because its surface suggests a patient of leprosy. However, these sturgeons were dedicated to emperors until the Shing dynasty period and called as “Higai=character of emperor’s fish”). This specimen donated by Earl of Tsugaru, however no such more information was found. *A. dabryanus* is considered near extinct in the wild, and its natural reproduction has not been observed for over 20 years. Therefore, a conservation program of the species based on large-scale farming was started to disseminate by the Yangtze River Fisheries Research Institute in 2007 (Qiwei 2022b).

Although Tanaka (1915) reported a single specimen of *A. dabryanus* was collected from the Ariake Sea (有明海), Kumamoto Pref. on 13th June 1915, the specimen could not find in this study, and the authenticity of the record is still questionable. This species was not recorded elsewhere in Japanese water except for Tanaka’s report, and known only from the Yangtze River Basin, Yellow River, and West Korea Bay (Amaoka and Muto 2003). It is indicated that a local newspaper article which posted this record could not be found. Takeuchi (1979) mentioned that a stuffed specimen of *A. dabryanus* was stored in Shimonoseki Municipal Shimonoseki Aquarium, Yamaguchi Pref. (presently “Kaikyokan”). Our research revealed that three stuffed specimens existed in two institutions at Yamaguchi Prefecture: HH-Pi 747 of 1500 mm SL is deposited in the Hagi Museum (Sonoyama et al. 2020; Takeuchi 1979), previously transferred from Kaikyokan; for the other two held in “Kaikyokan” (uncatalogued and each locality unknown), the specimen of 1471 mm SL observed in this study was in good condition. However, the larger-sized specimen was in poor condition, and was unfortunately discarded excluding a few parts of dorsal and ventral scutes (the remnants are enough for the identification). These specimens had re-identified them as *A. sinensis* in the present study, which indicating that there are currently no reliable record of *A. dabryanus* in Japanese waters.

*Acipenser medirostris* Ayres, 1854  
Green Sturgeon チョウザメ 中吻鯉

**ZUMT 944** (Fig. 2): stuffed specimen, 1150 mm SL, 1290 mm TL, 1119 mm FL, Ishikari River (石狩川), Hokkaido.

Countable characters: D 38; A 29; P<sub>1</sub> 47; P<sub>2</sub> 29+; DS 8+1; LS 32; VS 8+5+2.

Proportional characters: head length 26.8% SL; trunk breadth 12.5% SL; trunk height 14.7% SL; eye diameter 5.5% HL; pectoral-fin length 12.1% SL; outer barbel 9.5% HL; inner barbel 10.2% HL; mouth width 17.6% HL; snout to anterior nostril 9.8% SL; snout to mouth 16.1% SL; snout to eye 13.6% SL; snout to dorsal-fin origin 81.2% SL; snout to upper caudal-fin origin 93.9% SL; snout to pectoral-fin origin 29.2% SL; snout to pelvic-fin origin 60.9% SL; snout to anal-fin origin 73.9% SL.

**ZUMT 945** (Fig. 3): stuffed specimen, 1330 mm SL, 1450 mm TL, 1288 mm FL, Sea of Mikawa country (三河国) presently eastern Aichi Pref., purchased from Alan Owston, 2 Feb. 1900.

Countable characters: D 42; A 28; P<sub>1</sub> 46; P<sub>2</sub> 32; DS 7+2; LS 34; VS 8+5+3.

Proportional characters: head length 24.7% SL; trunk breath 12.1% SL; trunk height 12.6% SL; eye diameter 5.7% HL; pectoral-fin length 10.6% SL; outer barbel 10% HL; inner barbel 10.2% HL; mouth width 22.3% HL; snout to anterior nostril 8.8% SL; snout to mouth 15.3% SL; snout to eye 12.1% SL; snout to dorsal-fin origin 70.7% SL; snout to upper caudal-fin origin 90.7% SL; snout to pectoral-fin origin 25.1% SL; snout to pelvic-fin origin 57.4% SL; snout to anal-fin origin 77.2% SL.

**ZUMT 63413** (Fig. 4): 380 mm SL, 377 mm TL, 336 mm FL, Yangtze River, 金公淡?

Countable characters: D 35; A 23; P<sub>1</sub> 33; P<sub>2</sub> 27; DS 9+2; LS 33; VS 7+3+1; gill rakers 9+10.

Proportional characters: head length 27.7% SL; trunk breadth 10.3% SL; trunk height 8.4% SL; eye diameter 7.4% HL; pectoral-fin length 11.6% SL; outer barbel 18.8% HL; inner barbel 18.4% HL; mouth width 20.3% HL; snout to anterior nostril 12% SL; snout to mouth 17.3% SL; snout to eye 14.8% SL; snout to dorsal-fin origin 62.4% SL; snout to upper caudal origin 81.6% SL; snout to pectoral-fin origin 29.0% SL; snout to pelvic-fin origin 52.4% SL; snout to anal-fin origin 66.6% SL.

Remarks: ZUMT 944 and ZUMT 945 were registered under “*Acipenser mikadoi* Hilgendorf” on the ZUMT specimen ledger in 1906 (Koeda et al. 2022). These specimens were identified as *A. medirostris* in the present study. Although *A. medirostris* used to go upstream in the Ishikari River and Teshio River of Hokkaido and fished commonly by fixed nets on each mouth of the rivers, the sturgeons rapidly dwindled from 1935 and were presently assessed as the extinct (EX) category in the Red Data Book by the Japanese Ministry of the Environment (Otaki 1908; Haryu 2014).

The locality of ZUMT 945, “Mikawa country”, is the old name of the eastern Aichi Prefecture, and this specimen is the first record from the Pacific side of the Chubu region. However, it is possible that Mikawa was misspelled for “Mukawa River” (鶺川) in Hokkaido.

The newly assigned ZUMT 63413 third specimen was not registered on the specimen ledger before and discovered in the collection. The species occurs in the northern Pacific: the eastern Pacific of Alaska and Ensenada in Mexico, the Amur and Tumnin rivers on the western Pacific coasts, Sakhalin, North Japan, and the Bering Sea (Amaoka and Muto 2003). Hence, ZUMT 63413 is first recorded in the East China Sea and updates the southernmost limit of the species. A small cloth tag attached to the specimen (Fig. 5), indicated its locality (the Yangtze River, China, flows into the East China Sea) with three Chinese characters (probably 金公淡? might be the name of the local place or collector). Many sturgeons, including *A. medirostris*, are anadromous, so adults sometimes stray outside the known distributional range (Bemis and Kynard 1997). However, ZUMT 63413 is small in size and immature. Accordingly, there is a possibility that *A. medirostris* may have swum upstream in the Yangtze River and reproduced there in the past.

*Acipenser ruthenus* Linnaeus, 1758

Sterlet コチョウザメ 小体鮠

**ZUMT 63414**: 220 mm SL, 286 mm TL, 250 mm FL, donated from Rio (Japanese tropical fish wholesaler) to M. Aizawa (藍澤正宏), 1985?

Countable characters: D 44; A 29; P<sub>1</sub> 30; P<sub>2</sub> 26; DS 16; LS 65; VS 15+5; gill rakers 5+11.

Proportional characters: head length 33.5% SL; trunk breadth 11% SL; trunk height 12.4% SL; eye diameter 10% HL; pectoral-fin length 26% SL; outer barbel 19% HL; inner barbel 17% HL; mouth width 17% HL; snout to anterior nostril 13.5% SL; snout to mouth 19.5% SL; snout to eye 16.4% SL; snout to dorsal-fin origin 74.6% SL; snout to upper caudal-fin origin 95.2% SL; snout to pectoral-fin origin 35.7% SL; snout to pelvic-fin origin 62.7% SL; snout to anal-fin origin 82.7% SL.

Remarks: This specimen was imported as an aquarium fish to Japan.

*Acipenser schrenckii* Brandt, 1869

Amur sturgeon アムールチョウザメ 施氏鮠

**ZUMT 66264** (Fig. 6): 455 mm SL, 560 mm TL, 490 mm FL, Nizhnetambovskoe (village name near the Amur River), Kaludsenok, Russia, collected with gill net, 2 June. 1930, D. Kanevich.

Countable characters: D 38; A 22; P<sub>1</sub> 27; P<sub>2</sub> 21; DS 13+4; LS 34; VS 9+3+1.

Proportional characters: head length 25.5% SL; trunk breadth 13.7% SL; trunk height 14.6% SL; eye diameter

7.5% HL; pectoral-fin length 15.3% SL; outer barbel 19.8% HL; inner barbel 17.5% HL; mouth width 28.0% HL; snout to anterior nostril 10.1% SL; snout to mouth 13.3% SL; snout to eye 12.3% SL; snout to dorsal-fin origin 76.0% SL; snout to upper caudal-fin origin 96.3% SL; snout to pelvic-fin origin 67.2% SL; snout to pectoral-fin origin 28.9% SL; snout to anal-fin origin 26.8% SL.

Remarks: This specimen assigned to ZUMT 66264 as *Acipenser schrenkii* Brandt, 1869 was not registered on the ledger then and recently discovered in the ZUMT collection. ZUMT 66264 is attached two paper tags (Fig. 7). This specimen was posted in Pacific Fisheries Institute, Vladivostok, U. S. S. R. and identified by G. Lindberg (Georgii Ustinovich Lindberg) (Fig. 7: Left). The caption written on the tag is as follows in Russian (Fig. 7: Right): 2 июня 1930, Калудсенок, Река Амур у селения, Н-Тамбовское, Сплавной сеткой, Дан Каневич (2 June, 1930, Kaludsenok, Amur River near the village, Nijnetambovskoïe, gill net, Dan Kanevich).

***Acipenser sinensis* Gray, 1835**  
Chinese Sturgeon カラチョウザメ 中华鲟

**ZUMT 946** (Fig. 8): stuffed specimen, 1710 mm SL, 1950 mm TL, 1760 mm FL, holotype of *Acipenser kikuchii* Jordan & Snyder, 1901, off Misaki (三崎), Sagami Bay, collected with gill net, May 1895, collected by K. Aoki (青木熊吉).

Countable characters: D 55; A 36; P<sub>1</sub> 46; P<sub>2</sub> 36; DS 11+1; LS 32; VS 11+2+1.

Proportional characters: head length 22.6% SL; trunk breadth 14.8% SL; trunk height 14.2% SL; eye diameter 4% HL; pectoral-fin length 11% SL; inner barbel 5.3% HL; mouth width 21.8% HL; snout to anterior nostril 6.6% SL; snout to mouth 11.2% SL; snout to eye 9.1% SL; snout to dorsal-fin origin 77.7% SL; snout to upper caudal-fin origin 96.2% SL; snout to pectoral-fin origin 24.8% SL; snout to pelvic-fin origin 65.9% SL; snout to anal-fin origin 85.3% SL.

Remarks: Although *Acipenser kikuchii* “Kikuchi-chozame” was originally described based on a single specimen without information on the catalog number (Jordan and Snyder 1901), ZUMT 946 was the only specimen whose scientific name, and collection data matched with the original description (Aizawa et al. 2022). In this study, the specimen was re-identified as *A. sinensis*, which also resembles with the figure of the stuffed specimen shown in the original description (Jordan and Snyder 1901: Figs. 1–2, pl. 15). Further, Takeuchi (1979) previously observed the holotype and indicated that the species was a junior synonym of *A. sinensis*. Hence, we agree with his opinion.

**ZUMT 955** (lost) (Fig. 9): stuffed specimen, 2120 mm SL, holotype of *Acipenser multiscutatus* Tanaka, 1908, 7 miles off Ukedo-hama (請戸浜), Iwaki City, Fukushima Pref., collected by gill net, 21 May 1905.

Countable characters: D 42; A 35; DS 15–16; LS 41–43; VS 12–16 (from Tanaka 1908).

Proportional characters: head length 22.6% SL; trunk height 15.1% SL; snout to eye 34.4% HL; interorbital width 39.6% HL; between posterior end of dorsal- and caudal-fin bases 6.4% SL; longest dorsal-fin ray 5.7% SL; longest anal-fin ray 11.32% SL; longest pelvic-fin ray 8.2%; longest pectoral-fin ray 15.1% SL; length of upper caudal-fin lobe 25.5% SL; length of lower caudal-fin lobe 17.9% SL (from Tanaka 1908).

Remarks: The original description of *Acipenser multiscutatus* specified the holotype as ZUMT 955 which sized 2120 mm SL with the Japanese name “Sennin-chozame”. However, such a large specimen did not find in the ZUMT collection presently. Only the scientific name appeared in the column of ZUMT 955 in the specimen ledger (Aizawa et al. 2022). The four original film photographs of ZUMT 955 (Fig. 9) which used in the original description by Tanaka (1908: pl. II, fig. 1A and 1B, trimmed) were found in ZUMT digital archives. Although Tanaka (1908) noted that “Two, more or less imperfect skin of the same species purchased of a fish-merchant in Tokyo, are contained in the Imperial Museum of Tokyo”, these specimens are not founded in the National Museum of Nature and Science, Tsukuba City (NSMT), and not enrolled on a specimen ledger in this museum. *A. multiscutatus* was regarded as a synonym of *A. schrenkii* (Birstein and Bemis 1997). However, this synonym of *A. multiscutatus*, identifying between *A. sinensis* and *A. schrenkii* based on counts and measures is difficult.

Especially, many count characters have overlapped (Tables 1, 2). Hence, this study re-identified *A. multiscutatus* as a synonym of *A. sinensis* following comparison *A. sinensis* with *A. schrenckii* based on figures of dorsal scutes (Fig. 10). Scanning for Tanaka (1908: pl. II, fig. 1B), dorsal scutes of *A. multiscutatus* are bigger and lined densely between head and dorsal-fin base (Fig. 10A). This character is matched *A. sinensis* (Fig. 10B, C), dorsal scutes of *A. schrenckii* are inconspicuous over 892 mm SL at least (Fig. 10D, E).

#### Comparative specimens

*A. sinensis* (two specimens): uncatalogued, stuffed specimen, stored in Kaikyokan, 1471 mm SL, 1731 mm TL, locality unknown, donated from Taiyo fishing company (current: Maruha Corporation); KAUM-I. 99269, 2700 mm SL, 3100 mm TL, 158 kg, female, South of Mt. Kaimon, Ibusuki, Kagoshima Pref., Japan, 31°09'N, 130°32'E, collected by fixed net, captured on 17 May 1997. *A. schrenckii* (two specimens): FAKU uncatalogued, stuffed specimen, 892 mm SL, 974 mm TL, locality unknown, stored in Field Science Education and Research Center, Kyoto University; lost, 1640 mm TL, Off the Mombetsu coast, Hokkaido Pref., Japan.

*Pseudoscaphirhynchus* Nikolskii, 1900 シルダリアチョウザメ属

*Pseudoscaphirhynchus kaufmanni* (Bogdanow, 1874)

Large Amu-Darya Shovelnose Sturgeon オオアムダリアチョウザメ 阿姆河大拟铲鲟

**ZUMT 63411** (Fig. 11): 98.6 mm SL, Nukus, Turkestan, A. Nikolsky.

Countable characters: D 36; A 21; P<sub>1</sub> 40; P<sub>2</sub> 29; DS 11; LS 32; VS 5.

Proportional characters: head length 37.7% SL; trunk breadth 12.9% SL; trunk height 10.6% SL; eye diameter 3.8% HL; pectoral-fin length 17.6% SL; outer barbel 27.4% HL; inner barbel 13.7% HL; mouth width 34.2% HL; snout to anterior nostril 17.1% SL; snout to mouth 22.9% SL; snout to eye 20.7% SL; snout to dorsal-fin origin 80.0% SL; snout to pectoral-fin origin 33.0% SL; snout to pelvic-fin origin 67.2% SL; snout to anal-fin origin 85.8% SL.

Remarks: This species is known only from the Amu Darya River in Turkmenistan, Uzbekistan, and Tajikistan. Three species, *Pseudoscaphirhynchus fedtshenkoi*, *Pseudoscaphirhynchus hermanni* (Kessler, 1877), and *P. kaufmanni*, are recognized in the genus and considered “critically endangered”, however *P. fedtshenkoi* is probably extinct (Zholdasova 1997). Although *P. hermanni* was not observed ever since 1996, it was re-discovered in 2020 with *P. kaufmanni* (Sheraliev et al. 2021). ZUMT 63411 was discovered in the ZUMT collection was registered to the specimen ledger in this study. The information of collection and/or donation of ZUMT 63411 is unknown, however, a paper tag which attached to this specimen (Fig. 12), indicating its scientific name, locality (Nukus, Turkestan), and collector or donator (A. Nikolsky). Turkestan is an old name of Central Asia, and A. Nikolsky is Alexander Nikolsky (1858–1942) who originally described *Pseudoscaphirhynchus rossikowi* Nikolskii, 1900, which is presently recognized as a junior synonym of *P. hermanni* (Fricke et al. 2023). A same series which uncatalogued with common a type of paper and handwriting as ZUMT 63411 were found in the ZUMT collection (38 specimens in total) and are meaning that these series localities are restricted to Central Asia and East Russia. From the above, we assumed that international exchange of specimens between ZUMT and Russian institutions probably took place in the past. However, no such information was found.

**Polyodontidae** ヘラチョウザメ科

*Polyodon* Lacépède, 1797 ヘラチョウザメ属

*Polyodon spathula* (Walbaum, 1792)

North American Paddlefish ヘラチョウザメ 匙吻鲟

**ZUMT 64578** (Fig. 13): 401 mm SL, 479 mm TL, 426 mm FL, locality unknown, donated from the University of Michigan Museum of Natural History (jar in room 1044), 11 Oct. 1965, T. Ueno (上野輝彌).

Countable characters: D 53; A 53; P<sub>1</sub> 31; P<sub>2</sub> 32.

Proportional characters: head length 73.3% SL; trunk breadth 8.1% SL; trunk height 14.1% SL; eye diameter 2.8% HL; pectoral-fin length 9.5% SL; snout to anterior nostril 42.6% SL; snout to mouth 43.4% SL; snout to eye 44.5% SL; snout to dorsal-fin origin 80.8% SL; snout to upper caudal-fin origin 90.8% SL; snout to pectoral-fin origin 63.1% SL; snout to pelvic-fin origin 71.3% SL; snout to anal-fin origin 82.2% SL.

Remarks: This specimen assigned to ZUMT 64578 as *Polyodon spathula* (Walbaum, 1792) was not registered on the ledger then and recently discovered in the ZUMT collection. The species is distributed from the Mississippi River Basin from southwestern New York to central Montana and south to Louisiana, and Gulf Slope drainages from Mobile Basin, Alabama, to Galveston Bay, and Texas in northern America (Moore and Rider 2022). A paper tag attached to this specimen noted that “no data: found in museum jar in Rm. 1044 on 11:X:1965. use for classroom study”, thus it was captured before 1965, deposited in the museum probably for educational purpose and donated by Teruya Uyeno (1930–2021), who studied abroad at the University of Michigan from 1956 to 1965 (Hayashi 2017).

*Psephurus* Günther, 1873 ハシナガチョウザメ属  
*Psephurus gladius* (Martens, 1862)  
Chinese Paddle Fish ハシナガチョウザメ 白鯢

**ZUMT 25426** (Fig. 14): 649.6 mm SL, 735.5 mm TL, 663.6 mm FL, Yichang (宜昌), Yangtze River.  
Countable characters: D 68, A 60, P<sub>1</sub> 43, P<sub>2</sub> 43, gill rakers 26+23.

Proportional characters: head length 56.7% SL; trunk breadth 8.3% SL; trunk height 10.7% SL; eye diameter 1.0% HL; pectoral-fin length 8.1% SL; snout to anterior nostril 38.3 % SL; snout to mouth 41.7 % SL; snout to eye 39.8 % SL; snout to dorsal-fin origin 74.4 % SL; snout to upper caudal-fin origin 92.2 % SL; snout to pectoral-fin origin 56.7 % SL; snout to pelvic-fin origin 69.8% SL; snout to anal-fin origin 83.1% SL.

Remarks: This specimen was registered as *Psephurus gladius* (白鯢, 象魚) on the ZUMT specimen ledger probably in 1933 (Koeda et al. 2022). The paddle and body were separated with the same number tags attached. Although this species was previously distributed in wild from the Yangtze, Yellow, and Qiantang rivers, China (Amaoka and Muto 2003), its population began to decrease rapidly in the mid-20th century, and has not been confirmed since 2003, and presently considered as extinct and assessed EX in the Red List by IUCN (Zhang et al. 2020; Qiwei 2022a). Five specimens of *P. Gladius*, including ZUMT 25426: a two juvenile fish (National Museum of Nature and Science, Tsukuba City: NSMT-P 136893, 158.7 mm SL; Kitakyusyu Museum of Natural History and Human History, Kitakyusyu City: KMNH-VR uncatalogued 275 mm SL), young fish (The Kyoto University Museum, Kyoto University, Kyoto City: FAKU-P 352, 557.5 mm SL) and a stuffed specimen (Kanagawa Prefectural Museum of Natural History, Odawara City: KPM-NI 44803, 2160 mm FL) were presently deposited in the Japanese museum collection.

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Table 1. Counts of *Acipenser multiscutatus* and *A. sinensis*

	<i>A. multiscutatus</i>		<i>A. sinensis</i>		
	Tanaka (1908)	Present study		Hata et al. (2018)	—*
	ZUMT 955	ZUMT 946	uncatalogued specimen**	KAUM-I. 99269	—
Standard length (SL; mm)	2285.0	1710.0	1471.0	2700.0	—
Dorsal fin rays	42	55	65	65	50–65
Anal fin rays	35	36	35+	37	26–42
Pectoral fin	—	46	37+	49***	—
Pelvic fin	—	36	35+	29***	—
Dorsal scutes	15–16	11+1	12+1	14+1	10–15
Lateral scutes	41–43	32	28	36	27–41
Ventral scutes	12–16	11+2+1	11+4+2	12+1+1	9–15
Gill raker	—	—	—	17	15–25

\* Referenced from the changjiang aquatic resources survey group, Sichuan province (1988); \*\* deposited in Kaikyokan, Shimonoseki, Japan; \*\*\* counted during this study

Table 2. Counts of *Acipenser schrenckii*

	<i>A. schrenckii</i>				
	Present study		Amaoka and Muto (2003)	Omoto et al. (2004)	Gritsenko et al. (2006)
	ZUMT 66264	uncatalogued specimen*	—	—	—
Standard length (SL; mm)	455.0	892.0	—	—	—
Dorsal fin rays	38	31+ (broken)	50-	—	38-53
Anal fin rays	22	—	22–26	—	20-32
Pectoral fin	27	35	—	—	—
Pelvic fin	21	27	—	—	—
Dorsal scutes	13+4	14	13–15	13	11–17
Lateral scutes	34	39	38–48	37	32-47
Ventral scutes	9+3+1	11+2+1	7–10	2	—
Gill raker	—	—	—	—	36–46

\* Deposited in FAKU

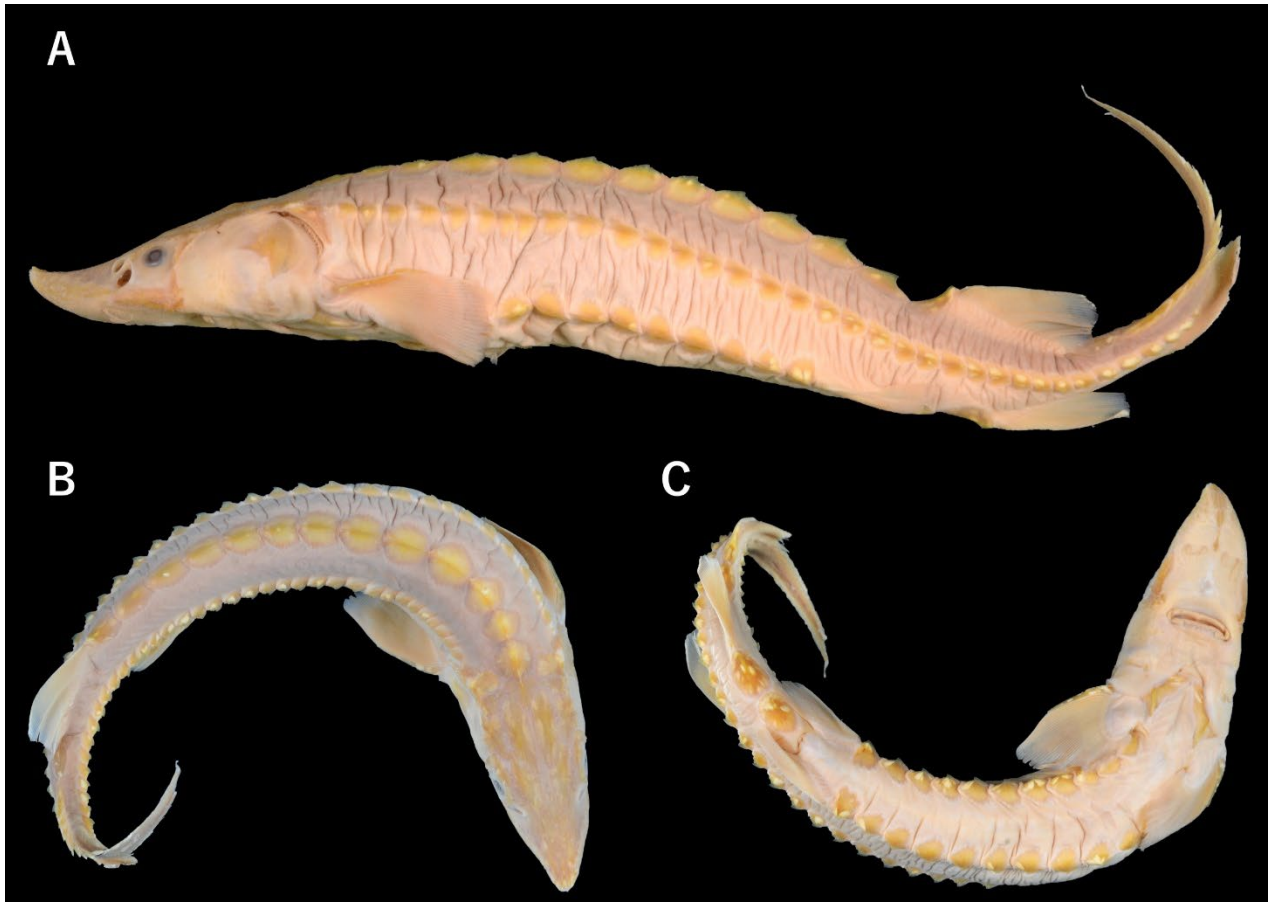


Figure 1. Preserved specimen of *Acipenser dabryanus* from Chongqing, Yangtze River, China (ZUMT 25427, 256 mm SL). A: lateral view; B: dorsal view; C: ventral view.



Figure 2. Preserved specimen (stuffed) of *Acipenser medirostris* from Ishikari River, Hokkaido Pref., Japan (ZUMT 944, 1150 mm SL).

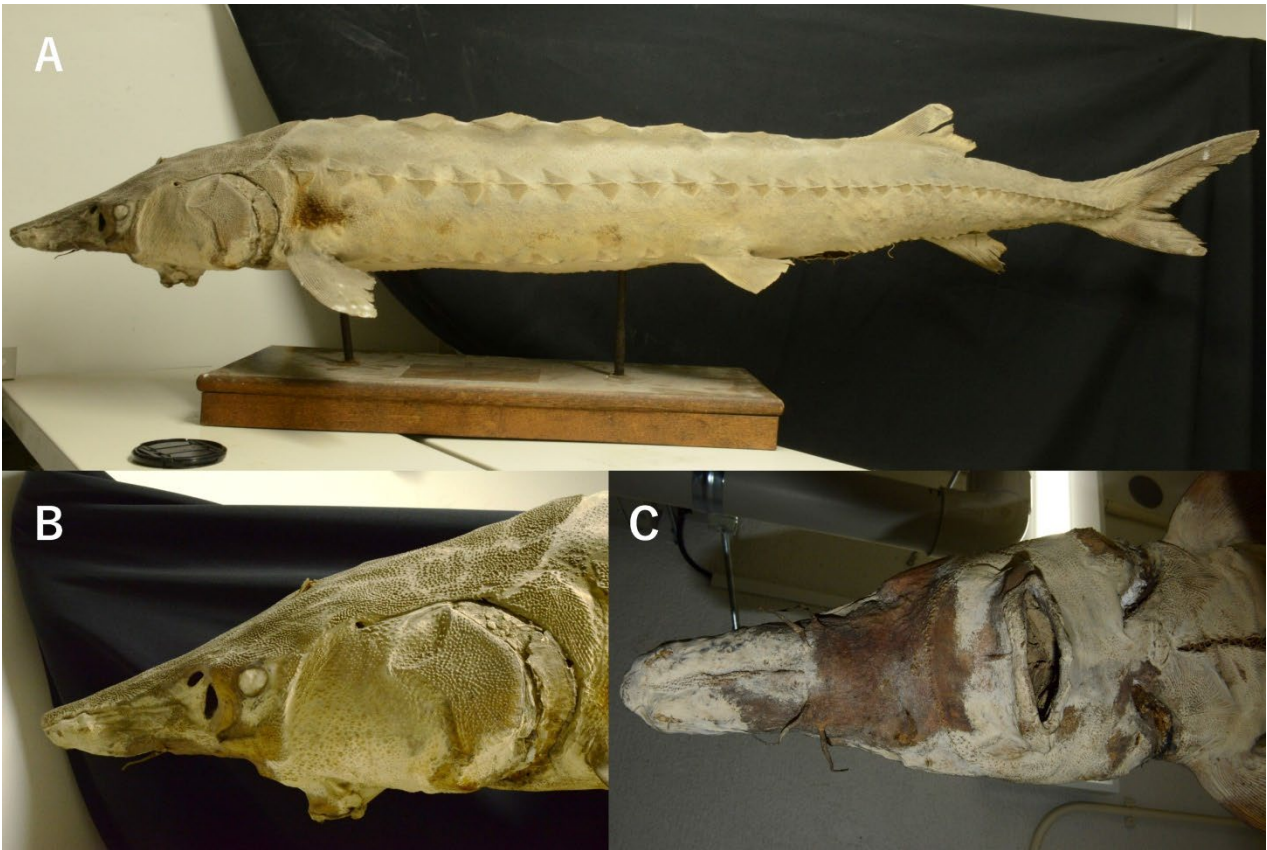


Figure 3. Preserved specimen (stuffed) of *Acipenser medirostris* from Sea of Mikawa country, Japan (ZUMT 945, 1330 mm SL). A: lateral view; B: lateral view of head; C: ventral view of head.



Figure 4. Preserved specimen of *Acipenser medirostris* from Yangtze River, 金公淡?, China (ZUMT 63413; 380 mm SL). A: lateral view; B: dorsal view; C: ventral view.



Figure 5. Tag of *Acipenser medirostris* (ZUMT 63413).



Figure 6. Preserved specimen of *Acipenser schrenkii* from Amur River, Russia (ZUMT 66264; 455 mm SL). A: lateral view; B: dorsal view; C: ventral view.

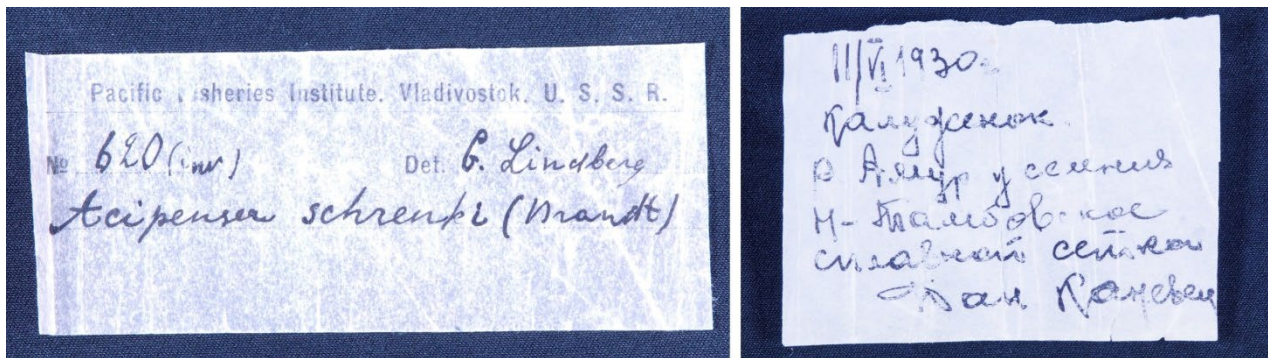


Figure 7. Tags of *Acipenser schrenkii* (ZUMT 63413).

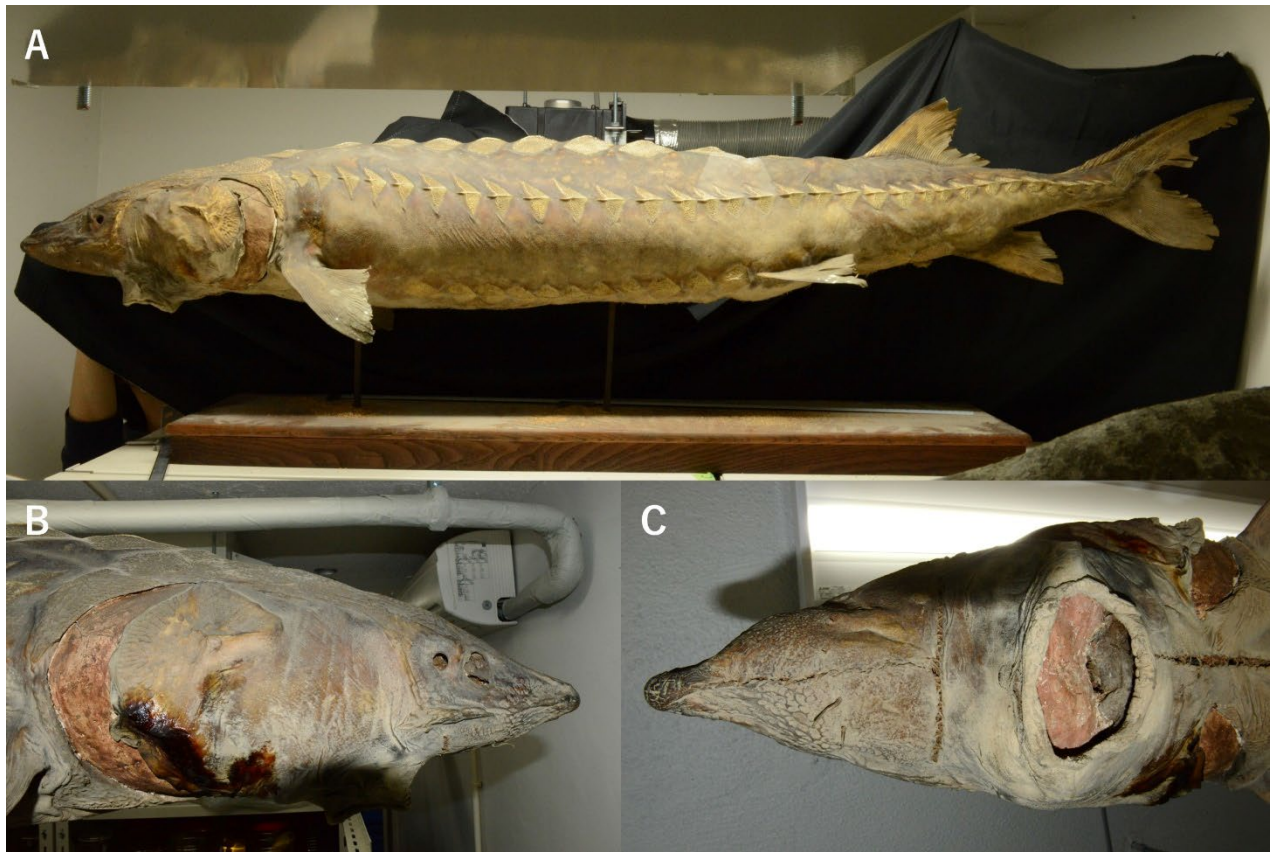


Figure 8. Preserved specimen (stuffed) of *Acipenser sinensis* from off Misaki (Sagami Bay), Japan (ZUMT 946; 1710 mm SL). A: lateral view; B: lateral view of head; C: ventral view of head.



Figure 9. Film photography of *Acipenser sinensis* from 7 miles off Ukedo-hama, Iwaki City, Fukushima Pref., Japan (ZUMT 955; 2120 mm SL).



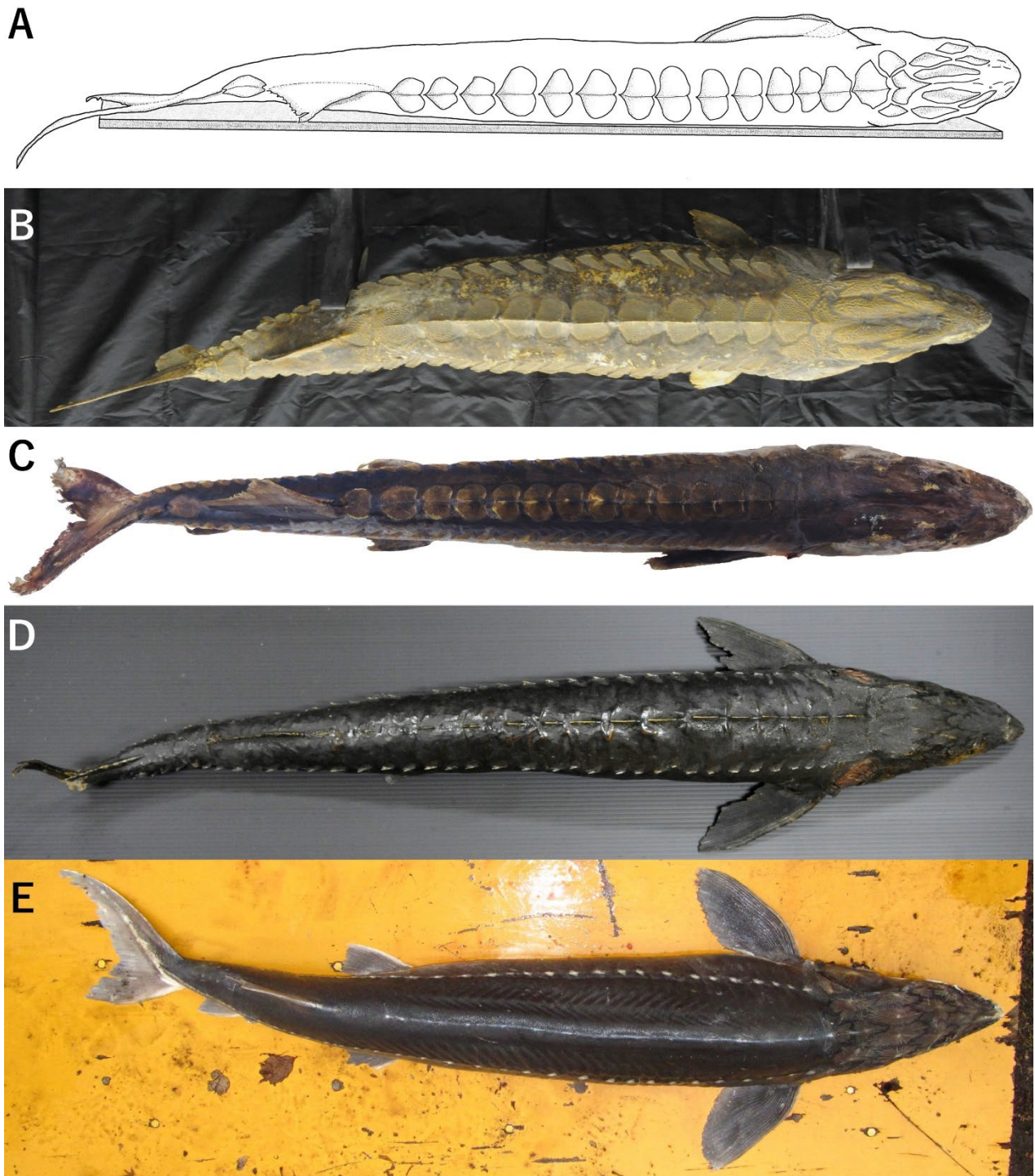


Figure 10. Dorsal view of *Acipenser sinensis* and *A. schrenckii*. A: *A. sinensis* (ZUMT 955, lost; 2120 mm SL), from 7 miles off Ukedo-hama, Iwaki City, Fukushima Pref., Japan, original figure by Tanaka (1908: pl. II, Figs. 1B), Illustrated by Keiya Kumaki; B: *A. sinensis* (uncatalogued, stuffed; 1471 mm SL), locality unknown, stored in Kaikyokan; C: *A. sinensis* (KAUM-I 99269; 2700 mm SL), from south of Mt. Kaimon, Ibusuki, Kagoshima Pref., Japan; D: *A. schrenckii* (FAKU uncatalogued, stuffed; 892 mm SL), locality unknown; E: *A. schrenckii* (lost, 1640 mm TL) from off the Mombetsu coast, Hokkaido Pref., Japan.

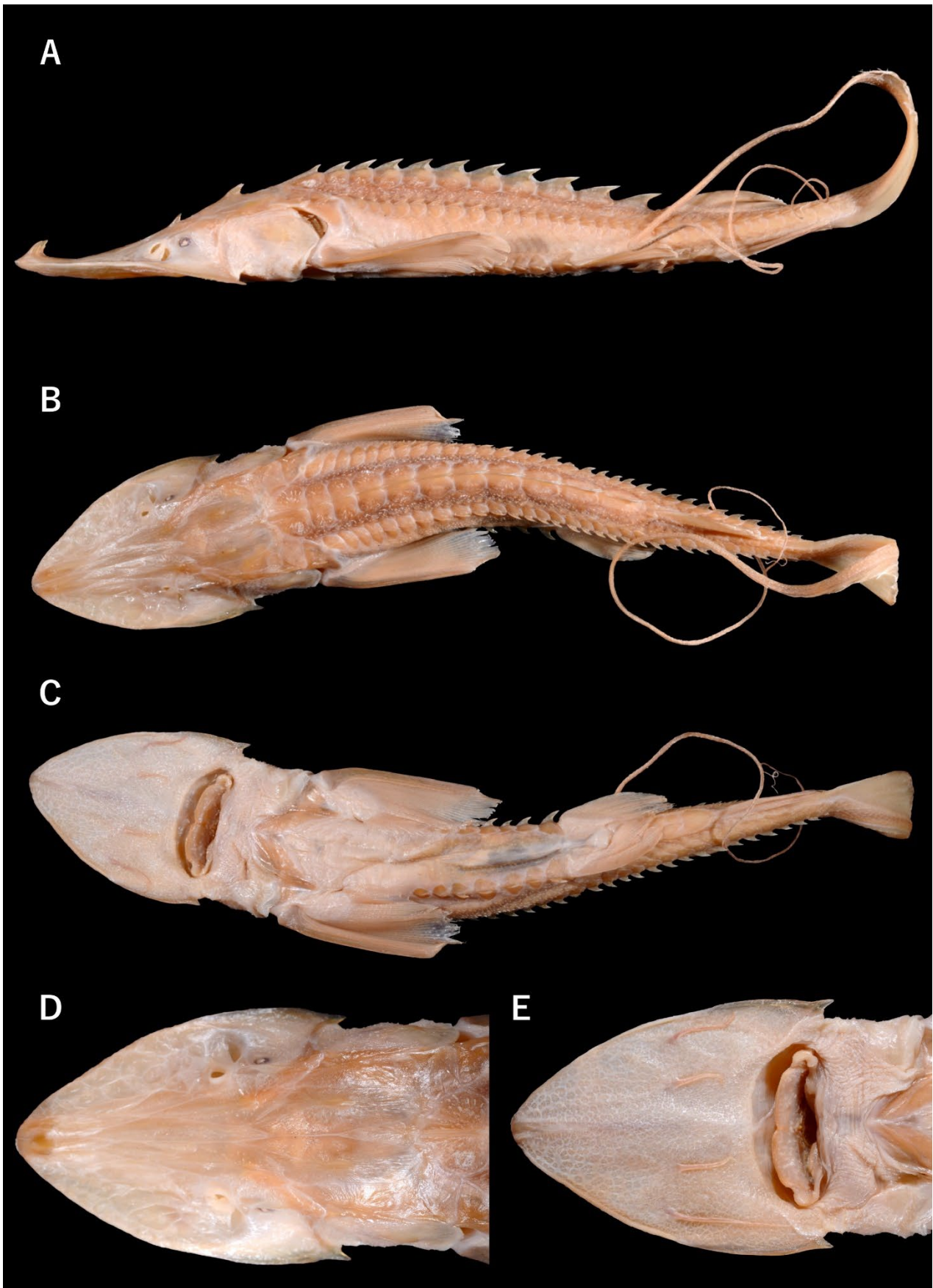


Figure 11. Preserved specimen of *Pseudoscaphirhynchus kaufmanni* from Nukus, Turkestan (ZUMT 63411; 98.6 mm SL). A: lateral view; B: dorsal view; C: ventral view; D: close-up of dorsal surface of head; E: close-up of ventral surface of head.

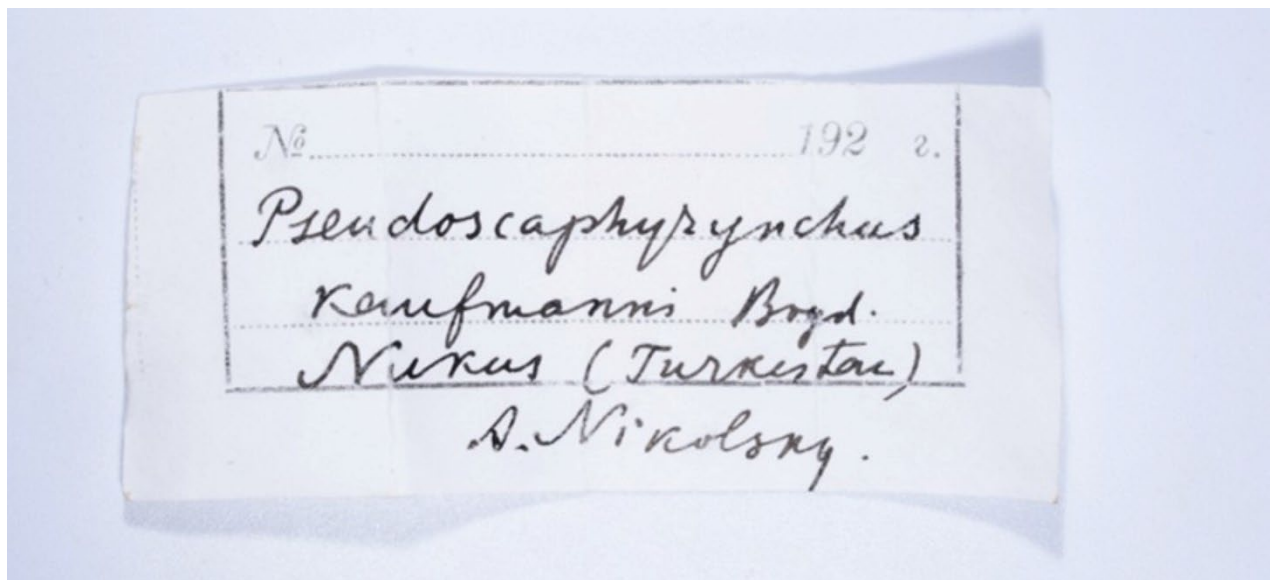


Figure 12. Tag of *Pseudoscaphirhynchus kaufmanni* (ZUMT 63411).



Figure 13. Preserved specimen of *Polyodon spathula*, donated from the University of Michigan Museum of Natural History (ZUMT 64578; 401 mm SL). A, B: lateral view; C: ventral view; D: close-up of ventral surface of paddle.



Figure 14. Preserved specimen of *Psephurus gladius* from Yichang, Yangtze River, China (ZUMT 25426; 650 mm SL). A: lateral view; B: dorsal view; C: ventral view.