

Additional registrations and revised taxonomy of Clupeiformes (Actinopterygii: Teleostei) deposited in the Department of Zoology, The University Museum, The University of Tokyo

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Abstract

A revised list of Clupeiformes specimens deposited in the Department of Zoology, The University Museum, The University of Tokyo includes newly found or registered material. The taxonomy of some species included in a recent listing has also been updated. Specimens of *Sardinella melanura* collected in 2023 represent the first records of that species from Sagami Bay.

Introduction

The order Clupeiformes includes more than 400 species, many being commercially important (Nelson et al., 2016; Birge et al., 2021). In recent years, more than 500,000 tons of *Sardinops melanostictus* (Temminck & Schlegel, 1846) have been caught annually in waters around Japan, the species representing the largest catch of any fish species in Japan since 2019. Additionally, some other clupeiform species, including *Etrumeus micropus* (Temminck & Schlegel, 1846) and *Engraulis japonica* Temminck & Schlegel, 1846, are also abundantly caught in Japanese waters (Statistics Department of Ministry of Agriculture, Forestry and Fisheries, Japan, 2023; Ministry of Agriculture, Forestry and Fisheries, Japan, 2023). Because clupeiform fishes have been studied for many years in Japan (e.g., Kishinouye, 1908, 1911), many specimens collected since the early 20th Century have been deposited in the Department of Zoology, The University Museum, The University of Tokyo (ZUMT), and were subsequently listed by Hata et al. (2022a). However, due to the many taxonomic studies of clupeiform fishes published since Hata et al. (2022a), with new species descriptions and applicable name changes (e.g., Agosinho et al., 2022; Hata and Motomura, 2022, 2023; Hata, 2023a; Hata et al., 2023b), the identities and type status of some ZUMT specimens have been changed. Furthermore, during ongoing reorganization of the ZUMT specimens, many unregistered clupeiform fishes were found. This article lists specimens included in Hata et al. (2022a), for which the species names have been changed, plus those newly found or registered.

Materials and Methods

The classification of clupeiforme families generally follows Wang et al. (2022). Species nomenclature and identifications of ZUMT specimens generally follow Whitehead (1985), Whitehead et al. (1988), Munroe et al. (1999a, b) and Wongratana et al. (1999), exceptions being noted in the Remarks following the applicable species. Specimens for which identifications have been changed, or which were newly found or registered are listed in “Revised specimens list” and “Additional specimens list”, respectively. Contents included in parentheses following registration numbers are as follows: [specimen counts, standard length; collection locality; collection date; collector; remarks (if applicable)]. Collection data of specimens are omitted if the same as that for the

previous specimen. The ZUMT specimens listed herein were stored in shelved containers (as of Sept. 2023) in Room 406 (specimen storage room) in the museum building, except for type-specimens stored in Room 407. Although one of the ZUMT specimens, collected by Dr. Tokiharu Abe, had not been registered into the ZUMT collection, with only partial collection data, it is listed herein together with the ZUMT ABE number (number with underbar written on the specimen label), in the hope that Dr Abe's catalog books with collection data will be rediscovered in the future. Additionally, specimens with catalogue numbers ZUMT ABE 2700 to 6000 were collected from Palau by Dr. Abe between 1936 and 1937 (Koeda et al. 2022).

Results

The identifications for 14 lots of ZUMT specimens listed in Hata et al. (2022a) have been changed to reflect the latest published research results. Additionally, 16 clupeiform species in 32 lots, including 75 specimens, have been newly found or registered. Among of them, two species (*Opisthopterus tardore* and *Thrissina porava*) had not been previously recorded in the ZUMT collection. ZUMT ABE 3035–3038 (*Thrissina samam*) and ZUMT ABE 3041–3044 (*Stolephorus balinensis*), specimens from Palau are now deposited in Natural History Museum, London as BMNH 1966.1.17.120–123 and BMNH 1966.1.17.143–146, respectively. In total, at least 79 clupeiform species in 1175 lots, including 2342 specimens, were found. In addition, newly registered specimens of *Sardinella melanura* were noted as the first records of that species from Sagami Bay.

Revised specimens list

Family Dussumieriidae

Dussumieria hasseltii Bleeker, 1851

ZUMT 41001 (1, 100.8 mm; Jolo Island, Philippines; Feb. 1909; coll. by K. Aoki and I. Iijima)

Remarks. Although this specimen was listed as *Dussumieria elopsoides* Bleeker, 1849 in Hata et al. (2022a), Hata et al. (2022c) showed that specimens previously identified as *D. elopsoides* included at least four species: true *D. elopsoides*, *D. hasseltii*, *Dussumieria modakandai* Singh, Teena Jayakumar, Kumar, Murali, Mishra, Singh & Lal, 2021, and *Dussumieria productissima* Chabanaud, 1933, the present specimen being identified as *D. hasseltii*. In addition, ZUMT 62628 (1, 102.3 mm; Jakarta, Java; 5 Mar. 1909; coll. by I. Iijima and K. Aoki), also listed as *D. elopsoides* in Hata et al. (2022a), was recognized as true *D. elopsoides*.

Family Engraulidae

Stolephorus diabolus Hata, Lavoué & Motomura, 2022

ZUMT 62056 (paratypes of *S. diabolus*, 5, 28.5–38.4 mm, Singapore; 23 Feb. 1922; coll. by D. G. Stead; although the lot originally included 9 specimens, two specimens each were subsequently deposited in the Kagoshima University Museum, Kagoshima (KAUM–I. 163702, 163703) and National Museum of Nature and Science, Tsukuba (NSMT-P 143554, 143555)

ZUMT 62106 (3, 27.4–32.9 mm; Singapore; 23 Feb. 1922; coll. by D. G. Stead, separated from ZUMT 10494)

Remarks. Although these specimens were listed as *Stolephorus bengalensis* (Datt & Babu Rao, 1959) in Hata et al. (2022a), Hata et al. (2022b) showed that specimens previously identified as *S. bengalensis* or *Stolephorus insularis* Hardenberg, 1933 (Whitehead et al., 1988; Wongratana et al., 1999) included at least four species: true *S. bengalensis*, *Stolephorus diabolus* Hata, Lavoué & Motomura, 2022, *Stolephorus eclipsis* Hata, Lavoué & Motomura, 2022, and *S. eldorado*. Specimens registered as ZUMT 62056 were designated as paratypes of *S. diabolus*.

Stolephorus eldorado Hata, Lavoué & Motomura, 2022

ZUMT 43430 (1, broken; Wenzhou City, Zhejiang Province)

Remarks. The specimen was listed as *S. bengalensis* in Hata et al. (2022a). See Remarks under *S. diabolus*.

***Thrissina samam* (Montrouzier, 1857) オオイワシ**

ZUMT 11282 (1, 84.3 mm), ZUMT 11283 [1, 92.8 mm; probably Okinawa-jima Island, Ryukyu Archipelago, Japan; coll. by S. Sakaguchi (Okinawa Prefectural Daiichi Junior High School)]

ZUMT 39727 (1, 41.8 mm; Okinawa-jima Island, Ryukyu Archipelago, Japan; 8 July 1936; coll. by S. Inuo)

ZUMT 40900 (8, 67.3–79.9 mm), ZUMT 41003 (1, 71.7 mm), ZUMT 41004 (1, 59.7 mm; Jolo Island, Philippines; Feb. 1909; coll. by I. Iijima and K. Aoki)

ZUMT ABE 3039 (1, 69.5 mm), ZUMT ABE 3040 (2, 56.5–73.8 mm; Palau)

ZUMT 62054 (7, 84.1–104.4 mm; Palau; stored in same bottle with ZUMT ABE 5963 and 5964)

Remarks. Although the above specimens were listed as *Thrissina baelama* (Fabricius, 1775) in Hata et al. (2022a), Hata et al. (2023a) showed that specimens previously identified as *T. baelama* included at least five allopatric species: true *T. baelama* (distributed in the Red Sea), *Thrissina evermanni* (Jordan & Seale, 1906) (Fiji, Tonga, and Samoa), *Thrissina polynemoides* (Günther, 1868) (off eastern coast of Africa), *T. samam* (western Pacific), and *Thrissina tuberculosa* (Lacepède, 1803) (Mauritius). All of the present ZUMT specimens were reidentified as *T. samam* [see Hata et al. (2023a)].

***Thrissina splendida* Hata, 2022**

ZUMT 44497 [paratype of *T. splendida*, 1, 114.9 mm; precise locality unknown, probably collected from Korea; coll. by G. Umaniwa (South Gyeongsang Province, Korea)]

Remarks. Although the specimen was listed as *Thrissina* sp. in Hata et al. (2022a: fig. 1C), it was later designated as a paratype of *T. splendida* by Hata (2022).

Additional specimens list

Family Spratelloididae

***Spratelloides gracilis* (Temminck & Schlegel, 1846) キビナゴ**

ZUMT 63780 (1, 59.5 mm), ZUMT 63781 (1, 54.5 mm; no data)

Family Engraulidae

***Coilia mystus* (Linnaeus, 1758)**

ZUMT 66572 (1, 303.0 mm; Daedonggang River, Pyongyang, North Korea)

***Encrasicholina heteroloba* (Rüppell, 1837) シロガネアイノコイワシ**

ZUMT 64556 (1, 65.6 mm; Kadogawa Bay, Kadogawa, Higashi-usuki, Miyazaki Prefecture, Japan, Oct. 2021, set net, donated by Y. Ogata and M. Fukatani)

ZUMT 66041 (33, 54.0–67.1 mm; off Songkhla Province, Gulf of Thailand, Thailand, 9 July 1985, trawl)

***Encrasicholina punctifer* Fowler, 1938 タイワンアイノコイワシ**

ZUMT 64219 [1, 42.6 mm; Kaohsiung, Taiwan, obtained from stomach of ZUMT 22609, *Scomberomorus guttatus* (Bloch & Schneider 1801)]

ZUMT 65911 (1, 67.8 mm; southwest of Gulf of Thailand, Thailand, 20 Aug. 1985)

***Engraulis japonica* Temminck & Schlegel, 1846 カタクチイワシ**

ZUMT 64992 (1, 32.7 mm; Japan, but details unknown, 23 July 1965)

***Stolephorus balinensis* (Bleeker, 1849) インドアイノコイワシ**

ZUMT 64425 [1, 94.9 mm; Kadogawa Bay, Kadogawa, Higashi-usuki, Miyazaki Prefecture, Japan (32°28'37"N, 131°39'42"E), 9 Nov. 2021, 8 m depth, set net, coll. M. Wada, donated by Y. Ogata and M. Fukatani]
ZUMT ABE 3041 (1, 82.6 mm), ZUMT ABE 3042 (1, 88.1 mm), ZUMT ABE 3043 (1, 82.1 mm), ZUMT ABE 3044 [1, 89.2 mm; Palau, coll. T. Abe; currently registered as BMNH 1966.1.17.120–123 (see Results)]

***Stolephorus baweanensis* Hardenberg, 1933**

ZUMT 66042 (4, 70.7–81.6 mm; off Songkhla Province, Gulf of Thailand, Thailand, 9 July 1985, trawl)

***Thrissina dussumieri* (Valenciennes, 1848) ツルギカタケチ**

ZUMT 63269 (7, 29.9–43.9 mm; Tamsui District, New Taipei City, Taiwan, purchased at Tamsui Fish Market, 30 Oct. 1919)
ZUMT 66046 (1, 89.7 mm; off Songkhla Province, Gulf of Thailand, Thailand, 9 July 1985, trawl)

***Thrissina porava* (Bleeker, 1849)**

ZUMT 66047 (1, 125.8 mm; off Songkhla Province, Gulf of Thailand, Thailand, 9 July 1985, trawl)

Remarks. See Hata and Lavoué (2024) regarding the nomenclature of this species.

***Thrissina samam* (Montrouzier, 1857) オオイワシ**

ZUMT ABE 3035 (1, 61.2 mm), ZUMT ABE 3036 (1, 71.6 mm), ZUMT ABE 3037 (1, 72.0 mm), ZUMT ABE 3038 [1, 66.9 mm; Palau, coll. T. Abe; currently registered as BMNH 1966.1.17.143–146 (see Results)]

***Thrissina setirostris* (Broussonet, 1782)**

ZUMT 63317 (2, 54.2–55.8 mm; Tamsui District, New Taipei City, Taiwan, purchased at Tamsui Fish Market, 30 Oct. 1919)
ZUMT 66048 (1, 114.1 mm; off Songkhla Province, Gulf of Thailand, Thailand, 9 July 1985, trawl)

Family Pristigasteridae

***Ilisha melastoma* (Bloch & Schneider, 1801)**

ZUMT 66043 (1, 123.8 mm; off Songkhla Province, Gulf of Thailand, Thailand, 9 July 1985, trawl)

***Opisthopterus tardoore* (Cuvier, 1829)**

ZUMT 66044 (1, 131.5 mm), ZUMT 66045 (1, 136.5 mm; off Songkhla Province, Gulf of Thailand, Thailand, 9 July 1985, trawl)

Family Dorosomatidae

***Clupanodon thrissa* (Linnaeus, 1758)**

ZUMT 45438 (1, 103.1 mm; Taiwan)

Remarks. Hata (2023b: fig. 1) figured this specimen.

***Nematalosa come* (Richardson, 1846) リュウキュウドロクイ**

ZUMT 60288 [1, 131.9 mm; estuary of Yonada-gawa River, Iriomote-jima Island, Yaeyama Islands, Ryukyu Archipelago, Japan (24°23'20.0"N 123°45'25.0"E), 20 Aug. 1989, cast net, coll. by M. Aizawa, H. Senou, T. Suzuki, and T. Uryu]

Sardinella gibbosa (Bleeker, 1849) ナンカイサツバ

ZUMT 65946 (1, 61.3 mm; off Songkhla Province, Gulf of Thailand, Thailand, 9 July 1985, trawl)

Sardinella melanura (Cuvier, 1829) オグロイワシ

(Fig. 1)

ZUMT 66516 [2, 47.2–54.9 mm; Nabetahama Beach, Shimoda, Shizuoka Pref., Japan (34°40'00.2"N, 138°56'10.3"E), 0.5 m depth, 9 Oct. 2023, hand net, coll. A. Kawakami]

ZUMT 66517 [1, 54.6 mm; Nabetahama Beach, Shimoda, Shizuoka Pref., Japan (34°40'00.2"N, 138°56'10.3"E), 0.5 m depth, 11 Oct. 2023, hand net, coll. A. Kawakami]

ZUMT 66518 [1, 54.2 mm; Nabetahama Beach, Shimoda, Shizuoka Pref., Japan (34°40'00.2"N, 138°56'10.3"E), 0.5 m depth, 25 Nov. 2023, hand net, coll. A. Kawakami]

Remarks. This species has been previously recorded from Kashima-nada Sea (Ibaraki Pref.) and off the Pacific coast south of Wakayama Pref. (Hata and Kanou, 2023: fig. 2). The present specimens, representing the first records of *S. melanura* from Sagami Bay, were collected on a shallow sandy beach.

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Fig. 1. Specimen of *Sardinella melanura*, ZUMT 66516, Nabeta-hama Beach, Shimoda City, Shizuoka Pref., Japan.