

ISSN 0910-2566

東京大学総合研究博物館
標本資料報告 第 128 号

The University Museum, The University of Tokyo
Material Reports No. 128

東京大学総合研究博物館動物部門所蔵
魚類標本リスト(1)

**Catalogue of fish collection deposited
in the Department of Zoology,
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Vol. 1**

小枝圭太・上島 励
Keita KOEDA and Rei UESHIMA

令和 4 年 東京
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小枝圭太・上島 励 (2022) 『東京大学総合研究博物館動物部門所蔵 魚類標本リスト(1)』

東京大学総合研究博物館標本資料報告第 128 号. 東京大学総合研究博物館, 東京.

Keita Koeda and Rei Ueshima (2022) Catalogue of Fish Collection Deposited in the Department of Zoology, The University Museum, The University of Tokyo. Vol. 1. The University Museum, The University of Tokyo, Material Reports No. 128. Tokyo: The University Museum, The University of Tokyo.

All communications pertaining to this publication should be addressed to the Editorial Board, The University Museum, The University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo 113-0033, Japan.

Issued March 2022

ISSN 0910-2566

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Printed by Soshi Kikaku Co., Ltd., Tokyo

はしがき

東京大学総合研究博物館動物部門には、2022年1月現在で63,000点以上の魚類標本が登録・収蔵されている。一つの登録番号に複数個体が登録されていることもあることから、その総数は15万個体とも推定されている。総数を含む全容は不明であるものの、動物部門所蔵標本において魚類標本が占める割合は極めて大きい。

東京大学総合研究博物館動物部門所蔵の魚類標本コレクション(ZUMT: The Department of Zoology, The University Museum, The University of Tokyo)の歴史は日本国内に現存する魚類標本コレクションとして最も古く、始まりは明治時代にまで遡る。魚類標本の収集を始めたのは1890年代に当時の東京帝国大学の教授であった箕作佳吉や飯島魁であるが、魚類標本をコレクションとして構築、管理を始めたのは1901年に東京帝国大学理学部動物学科に入学した田中茂穂(1878–1974)である。田中は1903年に箕作のもとで魚類の研究を始め、1904年より魚類標本の収集と管理を開始した。その際、米国スタンフォード大学のジョルダン(David Starr Jordan)より多数の海外産標本の寄贈を受けており、これらは最初期のZUMT標本として登録されている。その後の田中による近代的な魚類学への取り組みはジョルダンの影響を強く受けており、1913年にはジョルダンとその弟子のスナイダーとの共著で1235種の魚類を収録した「A catalogue of the fishes of Japan(日本産魚類目録)」を出版することになる。1905年に同大学の助手に就任した田中は、はじめの数年のあいだ箕作や飯島を始め、桑野久任、渡瀬庄三郎、青木熊吉など同大学の関係者や自身で収集した標本の登録や整理をおこないつつ、ギンザメ類を中心とした魚類分類の研究をおこなっていた。1911年に日本産魚類図説の編纂を開始すると同時に、田中の標本収集のスタンスは大きく変わり、日本全国(当時領有下にあった台湾や樺太、朝鮮、中国の一部、南洋諸島を含む)の学校教員や水産試験場職員、篤志家などから魚類標本を提供される体制をつくりあげた。これにより、田中が教授として定年退官する1939年までのZUMTには日本全国から膨大な数の魚類が標本として集められることとなった。未登録のまま置かれ、のちの時代に登録されたものも含めると、その総数は4万点をゆうに超え、標本の採集・提供者は約1000名にも及ぶ。これらの標本から得た情報や知識をもとに、田中は1931年に「On the distribution of fishes in Japanese waters(日本産魚類の分布)」を出版している。この論文は日本列島の海水魚の生物地理学的特性を論じた初めての論文であると同時に、現在の知見においても通じる極めて先進的な論文であったといえる。また収集された標本には、現在では採集が困難な場所から得られた標本が多数含まれる点や、対象分類群を限定しない網羅的な標本収集であったために約100年前の魚類相がそのまま記録されている点においても、これらの標本の量的・質的な学術的価値は計り知れない。

1930年頃より実務的な標本登録作業は、田中の最初の弟子である富山一郎(1906–1981; 1927年に入学)に引き継がれるようになった。富山は同じく田中に師事した阿部宗明(1911–1996; 1932年に入学)とともに、全国から集められた標本の整理や標本室の移動を担当した。富山は日本におけるハゼ類の分類学的研究に取り組み、日本のハゼ研究の基礎を築いただけでなく、1930年代に富山湾や有明海を訪問して膨大な数の標本を収集してZUMTに登録している。1937年に上海自然科学研究所へ赴任したのち終戦を迎え、終戦後は東京大学三崎臨海実験所や宮内庁などに勤務しながらZUMT標本に関わった。1960年に東京大学の教授に就任すると、1961年にはサラワクへ出張し、サラワク博物館より標本の寄贈を受けている。

富山の後輩にあたる阿部は、田中のもとでフグ類の研究をおこない、これらやトビウオ類において多くの業績を残すこととなる。阿部は 1936 年から 1 年間パラオ熱帯生物研究所に滞在した。この期間をはじめ阿部は数多くの標本を国内外から収集しているが、ほとんどの標本を ZUMT に登録しておらず個人コレクションとして同標本庫内に混在させている。これらの標本はタグ番号に下線が引かれていることで基本的に識別できるが、標本台帳の大半が発見されていないことなどにより、標本に関する情報が得られないものが多くを占める。

そのほか田中に師事し、ZUMT 標本に関わった人物を以下に示す。高知から数多くの標本を提供した蒲原稔治(1923 年入学)は、1928 年に高知高等学校教授に任命後、魚類の分類学的研究を開始し、田中に師事した。三井海洋生物研究所に在籍した石田寿老は、1933 年に同研究所から標本を多数提供するとともに、1936 年には樺太からサケ類の標本を多数持ち帰り、田中のもとで研究をおこなった。1935 年に田中の門下生となった犬尾三郎はベラ類の研究をおこなっていたものの、太平洋戦争で戦死した。中学の頃より魚類を収集し、1929 年には標本も提供していた増田繁雄は 1937 年に入学し、田中のもとでハタ類の研究に取り組んだが、若くして太平洋戦争で戦死した。

1939 年に田中が退官したのち、戦後の ZUMT 標本の管理は富山(東京大学三崎臨海実験所に勤務)と阿部(農林省東海区水産試験所に勤務)によって続けられたものの、本格的な整理は富山の弟子である富永義昭(1936–1994; 1955 年入学)によって進められることとなる。富永は 1959 年より富山に師事してハタンボ科魚類の研究に取り組み、1963 年に博士課程を中退して三崎臨海実験所の助手に任官される。1966 年には東京大学総合研究資料館が発足し、各学部の収蔵標本が新設された資料館で部門ごとに管理されることとなったが、この際の標本庫の移動は富永の主導により進められた。また、これに際しホルマリン保存であった標本を、エタノールに置換する作業も進められたという。翌年、富山は九州大学天草臨海実験所に赴任し、富永は家業である複数の会社の社長または代表取締役となった。これにより、1967 年以降の資料館および総合研究博物館には魚類の専任教員が不在となった。富永は家業の傍ら理学部の非常勤講師を勤め、1994 年に逝去するまで私財で補いながら標本の維持・管理をおこない、数多くの標本を収集・登録するとともにタイプカタログの製作にも取り組んだ。標本を永続的に管理するための保存瓶にも工夫を重ね、現在の標本庫の標本管理体制の土台を作り上げた。1973 年に阿部の弟子である佐藤寅夫が資料館の助手に赴任し、フェフキダイ類の研究をおこなった。

富永は藍澤正宏(1983–1991 年)、坂本一男(1989–1995 年)、白井 滋(1993 年?)を個人的に雇用し、ZUMT 標本の維持・管理をおこなった。1984 年には資料館の増築に伴う標本庫の再度の移動があり、現在の標本庫(406 号室)へと富永・藍澤の主導により標本が移された。また、富永は理学部の元事務員である長田美子(1994–1995 年)を雇用して、紙の標本台帳を電子ファイル(エクセルデータ)に書き出す作業をおこなった。藍澤、坂本は、その後も現在に至るまで客員研究員あるいは研究事業協力者として標本の維持・管理を進めるとともに外部からの標本の観察や借用依頼への対応をおこなっている。また、2020 年におこなわれた耐震工事の際には標本庫の改修にともなう標本の一時避難などを主導した。その間、回遊生態を専門とする黒木真理(2010–2012 年)と筆頭編者(2021 年より現在)が ZUMT の管理に関わっている。

上記のように、ZUMT は約 120 年にわたる歴史のなかで積み上げられた標本コレクションである。しかしながら、歴史の折り返し地点にあたる 1967 年以降から現在に至る約 60 年間に於いて魚類の専任教員が不在であったことも大きく影響し、十分な管理状況が維持されてきたとは言い難い状況が続いている。魚類標本の大半はエタノールまたはホルマリンの液浸標

本であるが、経年劣化による保存容器の破損や保存液の揮発、ホルマリンでの長期保管による劣化などにより、標本の価値が消失あるいは著しく低下したものが多数みられ、「首の皮一枚」の状態で見られているのがコレクションの現状といえる。未登録のまま標本瓶に保管された標本も多数混在し、そのなかには 1900 年代初頭に採集された貴重なものもしばしばみつかるといえる。所在不明の標本も多く、これらの標本が実在してはいるものの発見されないのか、あるいは幾度かに渡る標本庫の移動や震災、戦争などの影響により失われてしまったのかも不明である。ZUMT はその標本群そのものの重要性に加え、300 種以上のタイプ標本が登録されており、国内外の研究者より標本についての照会があるものの、このように整理が行き届いていない状態であるため、利用が難しい状況にあった。

そこで、ZUMT 魚類標本の公開利用および適切な管理を可能にすることを目的として、所蔵標本の目録作成およびデータベース化のプロジェクトが平成 11 年度から開始された。実際の作業は、標本的価値のあるものの選別、標本の分類群別の再配置から始まり、標本ビンの清掃、容器交換、エタノールの補充、ラベルデータの読み取り、標本の再同定、登録、文献調査、標本台帳の確認、データベースへの入力、廃液や廃棄物の処理など膨大な労力を要した。これまで魚類標本の整理が進まなかった背景には、30 年前に設置された標本棚には空きスペースがほとんどなく、標本の移動がほとんどできなかったことがある。しかし、2020 年に行われた当館の耐震工事に伴って、標本庫の全面的な改修が行われ、標本棚を新調したことによって標本の大規模な再配置が可能となり、整理作業が大きく進められる作業環境ができた。さらに、2021 年度以降は筆頭著者を中心として外部研究者やボランティアによって整理作業が積極的に進められており、約 6500 点の標本の確認作業を終えるに至った。今回は、これらのうちすべての作業が完了した 2 目と 10 科の分類群について標本目録を出版することができた。今回の標本目録は単なる収蔵品カタログではなく、標本の学術的意義、研究史、その標本をもとに記載された種の再評価などが、専門家の立場からまとめられた論文集である。また、本リストには、動物部門に現存する標本のみならず、タイプ標本を発見できなかった種も明記されており、このような情報は今後分類学的な整理をおこなううえで有用である。タイプ目録の作成については富永氏主導のもとと藍澤氏、坂本氏によって 1985 年より着手され、タイプ室(407 号室)を新たに設けて整理するなど重点的に進めてきた。その重要性から、分類群毎の標本目録とは別にタイプ標本の目録の作成作業も並行して進めている。今回は、これらのうちウナギ目の目録について掲載することができた。

今回の整理作業の過程で、予期せぬ貴重な標本(多数のタイプ標本を含む)が続々と発見された。担当した研究者らによって、これらを活用した研究が進められており、その一部は論文として出版されている。また、本号のチョウチョウウオ科魚類標本目録で議論したように、ZUMT 標本を調査することにより 100 年前から現在にいたる魚類相の変化を考察することもでき、標本の価値が改めて評価されることへと繋がった。今後も、本プロジェクトが推進されることにより、多様性生物学、分類学ならびに魚類学の歴史に関わる貴重な資料として、学術の発展に大きく寄与することが期待される。なお、本目録に発表された標本のデータは博物館の HP 上で公開され、国内外の研究者のアクセスが可能になる予定である。

最後に、本プロジェクトの推進および本目録の出版に際しては多くの方々のご協力を得た。東京大学総合研究博物館の研究部教員、事務職員の方々には様々な御支援をいただいた。特に、2020 年の標本庫の全面的改修工事に際しては、米村裕次郎副課長をはじめ博物館事務職員の方々の多大なるご尽力をいただいた。本プロジェクトは、平成 11-令和 3 年度の本学総合研究博物館プロジェクト研究経費、公開利用経費による援助を受け

て実施された。藍澤正宏氏、坂本一男氏、畑 晴陵氏、和田英敏氏には、標本の観察や同定、管理・維持作業に加え原稿の執筆、確認をしていただいた。宮下雄博氏、尾形比呂哉氏および東京海洋大学の阿部伊央太氏、藤原咲紀氏、飯沼 藍氏、齋藤 舞氏、高橋あゆみ氏には ZUMT 標本の管理・維持作業を手伝っていただいた。これらの方々に、この場を借りて、厚くお礼申し上げたい。また、ZUMT 標本が今日に至るまでに多大な貢献をいただいた故富永義昭氏に深い感謝の意を示したい。富永氏の情熱的かつ献身的な ZUMT への取り組みがなければ、本コレクションは「首の皮一枚」すら残らない状態で今日に至り、その価値の多くを失っていたであろうことは想像に容易い。筆頭編者は富永氏と同じハタンポ科魚類を専門としていることから、自身の研究を始めた当初より富永氏の出版したハタンポ科魚類に関する美しい論文の数々を拝読してきた。今日、同じ所属となり、同じコレクションに触れ、富永氏の思いを紡ぐことになったことには深い縁を感じざるをえない。富永氏は「この様な貴重な標本を、いかに賢く堅実に守り継ぐかが、最大の課題である」(東京大学総合研究資料館ニュース、10 号、1987 年)と述べられている。私たちの活動がその課題を乗り越える一助となると信じ、これからもこのプロジェクトをさらに邁進させていきたい。

2022 年 1 月 13 日

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Abstract

A detailed investigation of the Pempheridae (Teleostei: Perciformes) collection deposited in the Department of Zoology, The University Museum, The University of Tokyo (ZUMT) found 1064 specimens in 365 lots, including holotypes and paratypes of *Pempheris nyctereutes* Jordan & Evermann, 1902 and *Pempheris xanthoptera* Tominaga, 1963, and non-type specimens of 13 species in 2 genera. The paratypes of *P. xanthoptera*, for which the catalog numbers had not been noted in the original description, were determined on the bases of collection localities and dates.

Introduction

The fish collection preserved in the Department of Zoology, The University Museum, The University of Tokyo (ZUMT) includes specimens collected during the early period of modern-day ichthyology in Japan (from 1890's to 1930's) by Dr. Shigeo Tanaka (田中茂穂), a Professor of Zoology at the Imperial University of Tokyo. Dr. Tanaka collected many fish specimens from around Japan, most of them being retained in the collection, with some being used in the series "Figures and descriptions of the fishes of Japan, including Riukiu Islands, Bonin Islands, Formosa, Kurile Islands, Korea, and Southern Sakhalin" (Tanaka 1911). Ichthyological positions in the museum were subsequently held by Drs. Ichiro Tomiyama (富山一郎) and Tokiharu Abe (阿部宗明), both former disciples of Dr. Tanaka, and later by Dr. Yoshiaki Tominaga (富永義昭), a former disciple of Dr. Tomiyama. In total, the ZUMT collection includes more than 300,000 specimens, registered under more than 60,000 catalog numbers, including the type series of more than 300 species, that had been collected mainly by the aforementioned researchers or their collaborators up to the 1980's.

The family Pempheridae (Perciformes) was one of the main groups of interest for Dr. Tominaga, who was interested in phylogenetic relationships based on anatomy (Uyeno 1994), and published many significant papers on the group (Tominaga 1965, 1968, 1986). His review of the family in Japan (Tominaga 1963) included the new species *Pempheris xanthoptera* Tominaga, 1963, although most subsequent publications continued to include that species under *Pempheris schwenkii* Bleeker, 1855 [e.g., Hatooka and Yagishita (2013)], due to the

morphological similarity of both species. Recently, *P. schwenkii* was tentatively recognized as having “Pacific” and “southern Japan” types, the latter closely matching *P. xanthoptera* sensu Tominaga (1963) [e.g., Koeda (2017, 2018ab, 2020), and Kimura et al. (2017)]. *Pempheris xanthoptera* is used in the present report for the latter type, on the basis of morphological and genetic data (K. Koeda, unpublished). However, the application of the Japanese standard name “Minami-hatampo” is not considered here, the name being tentatively used for both species.

In the recent studies on the family of Japanese waters, two new species and two new records of pempherid species from Japanese waters were described by Koeda et al. (2010a,b, 2013a) and Koeda and Motomura (2017). In addition, the previously confused use of the standard Japanese name especially for “Ryukyu-hatampo” for *Pempheris adusta* Bleeker, 1877 was clarified (Koeda et al. 2013b).

Materials and Methods

The specimens of Pempheridae in ZUMT were re-identified by the first author in the present study, generally following Koeda et al. (2010a,b, 2013a,b) and Koeda and Motomura (2017), together with some unpublished taxonomic studies, and confirmation of at least one diagnostic character. Generally, the standard length (SL) of each specimen was measured, but only of the largest and smallest in cases of a large number of specimens in a single lot. Although, some of the ZUMT specimens collected by Dr. Abe had not been formally cataloged into the ZUMT collection (and the data of some specimens not retained), such specimens which can recognize by having underbar with the number on the accompanying label, are listed herein with the number ZUMT ABE XXXX, due to the possibility of future discovery of Dr. Abe’s remaining catalog books with collection data. A similar situation existed for Dr. Tominaga, who catalogued Pempheridae specimens as “P-XX (number)”, together with collection data. Those specimens are listed herein as ZUMT P-XX (number). Species are arranged in alphabetical order by species name. Specimens with the same collection locality and date are listed together. Local and personal names are given in Japanese (in parentheses) for specimens thus treated in Japanese in the specimen ledger. The list includes collection locality, ZUMT number with number of specimens in parentheses when two or more, size, type (abbreviated when non-type), collection date, collector or donator and affiliation, collection method, and remarks when available.

Collection of Pempheridae in ZUMT

Examination of the specimens of Pempheridae deposited at ZUMT disclosed 365 lots, comprising 209 ZUMT lots, 119 ZUMT P lots, and 36 ZUMT ABE lots, a total of 1064 specimens. Two genera and 14 species were confirmed, including the holotypes of *Pempheris nyctereutes* Jordan & Evermann, 1902 and *P. xanthoptera*. The latter species, described by Tominaga (1963), and he listed the paratypes as follows: more than 300 paratype specimens (15 to 135 mm SL), from Kominato, Chiba Pref.; Misaki and Manazuru, Kanagawa Pref., Oshima I. (Izu-oshima I.), off Sagami Bay; Hachijo I.; off Narayama, Shizuoka Pref.; Mie Pref.; Tanabe, Wakayama Pref.; Suzaki, Kochi Pref.; Totoro, Miyazaki Pref.; Taniyama, Kagoshima Pref.; Goto Is.; Tanegashima I.; and Okinawa I. Although the catalog numbers of the specimens were not given in the original description, the paratypes were determined on the bases of collection localities and dates, as are indicated in the list. Some pempherid specimens were dissected or stained by Dr. Tominaga for his research.

Pempheridae ハタンボ科

Parapriacanthus Steindachner, 1870 キンメモドキ属

Parapriacanthus ransonneti Steindachner, 1870 キンメモドキ

[Japan]

Chiba Pref.

Kamogawa (鴨川), Kominato (小湊): ZUMT 44402, 54.8 mm SL, Aug. 1936; Hatakeyama (畠山; name unknown): ZUMT P-15, 52.4 mm SL, Sept. 1958, Yasuda (安田).
Tateyama (館山): ZUMT P-16, 61.1 mm SL, ZUMT P-17, 37.9 mm SL, 27 Oct. 1959, Y. Tominaga; ZUMT P-19, 21, 23, 25–31 (11), 56.5–63.1 mm SL, Oct. 1959, Ueno (上野; name unknown).

Remarks: Collection locality written as “Kouzu (香津)”, but not known in Tateyama.

Tokyo Met.

Izu Is. (伊豆諸島), Hachijo-jima Island (八丈島): ZUMT 41859 (117), 22.3–29.3 mm SL, M. Uchiyama; ZUMT 42900 (41), 31.6–44.6 mm SL, Sept. 1922, M. Uchiyama (内山 操).
Tokyo Market (東京市場; details of collection unknown): ZUMT 32274, 68.4 mm SL, ZUMT 33275, 67.2 mm SL.

Kanagawa Pref.

Miura (三浦), Misaki (三崎): ZUMT 49161, 51.4 mm SL, ZUMT 49162, 49.6 mm SL, 1956, I. Tomiyama; Aburatsubo (油壺): ZUMT P-5, 50.7 mm SL, stained and dissected, ZUMT P-6, 50.0 mm SL, stained, 11 July 1957, Yasuda, Masu-ami (升網; small-sized set net); ZUMT P-8, 56.9 mm SL, 20 July 1954, Yasuda, Masu-ami; ZUMT P-260–270, 271–273, 275, 277, 278 (16), 48.2–56.2 mm SL, 30 June 1960, Choko-ami (チョコ網; details unknown).
Manazuru (真鶴): ZUMT P-491, stained and dissected (size N/A), 25 Sept. 1960.

Wakayama Pref.

Kushimoto Market (串本市場): ZUMT 55808, 57.4 mm SL, 15 Aug. 1965.
Tanabe (田辺) [written as Kishu-tanabe (紀州田辺)]: ZUMT 22524, 22537, 22575 (3), 65.6–68.5 mm SL, Jan. 1920, N. Ui (宇井縫蔵); ZUMT 44058, 63.6 mm SL, ZUMT 44061, 58.7 mm SL.

Kochi Pref.

Muroto (室戸), Kiragawa (吉良川): ZUMT 19934, 69.5 mm SL, 3 Jan. 1930, T. Kamohara (蒲原稔治: 高知高等学校).
Susaki (須崎): ZUMT 19003, 73.3 mm SL, Aug. 1928.
Unknown: ZUMT 34621, 69.7 mm SL, ZUMT 34622, 66.4 mm SL.

Miyazaki Pref.

Nobeoka (延岡), Totoro (土々呂): ZUMT 52155, 66.6 mm SL, 4 Aug. 1960; ZUMT P-34–39, 41, 42, 44, 45, 49–56, 59, 61–67, 70, 72–74, 77, 78, 80, 81, 84, 85, 87–101, 104–106, 108–111, 113, 114 (60), 30.8–63.0 mm SL, some specimens stained, 10 Sept. 1959, Kodai-ami (コダイ網; details unknown), Y. Tominaga.

Kagoshima Pref.

Minamisatsuma (南さつま), Akime (秋目): ZUMT 24145, 24153–24159 (8), 40.4–73.4 mm SL.

Nagasaki Pref.

Hirado (平戸), Ikitsuki (生月), Honura (本浦): ZUMT 50410, 63.7 mm SL, 25 Oct. 1953.

Goto Is. (五島列島), Nakadori-jima I. (中通島): ZUMT 50187–50189 (3), 56.1–60.2 mm SL, 18 Oct. 1953, I. Tomiyama.

Goto Is., Madara-jima I. (斑島): ZUMT 50219–50222 (4), 60.8–61.5 mm SL, 20 Oct. 1953, I. Tomiyama.

Goto Is., Fukue-jima I. (福江島), Tamanoura (玉之浦): ZUMT 48210–48219 (10), 46.0–67.2 mm SL, 23 May 1953, I. Tomiyama; ZUMT P-253–259 (7), 49.2–68.6 mm SL, 18 May 1960, set net; locality details unknown: ZUMT 59878, 64.4 mm SL, 10 June 1953, I. Tomiyama.

Remarks: The collection locality, written as “Tamanoura (田ノ浦)” on the specimen ledger for ZUMT P-253–259, could refer to several locations in Japan. However, Ichiro Tomiyama is known to have actively collected specimens from the Goto Islands region during the period specified.

Unknown: ZUMT 7320, 69.8 mm SL, ZUMT 7321, 69.5 mm SL, I. Kaneko (金子一狼).

Remarks: Although the collection dates of ZUMT 7320 and ZUMT 7321 were not recorded on the specimen ledger, they are estimated as having been during the period (1890's to 1920's) when Ichiro Kaneko (金子一狼) sent many specimens to Shigeo Tanaka.

Okinawa Pref.

Okinawa Is. (沖縄諸島), Okinawa-jima I. (沖縄島), Motobu (本部): ZUMT 51951–51958 (P-280–287), 23.6–47.5 mm SL, ZUMT 51955 stained, 1960 (summer), T. Abe; Itoman (糸満): ZUMT 17089 (52), 31.7–46.2 mm SL, stained; locality details unknown: ZUMT 41866, 42776–42778, 44280 (5), 36.9–44.2 mm SL, 8 July 1935, S. Inuo (犬尾三郎).

Yaeyama Is. (八重山諸島), Ishigaki-jima I. (石垣島): ZUMT 55805 (18), 45.1–55.4 mm SL, 9 Oct. 1970.

Yaeyama Is., Kohama-jima I. (小浜島): ZUMT P-514–518 (5), 40.0–46.3 mm SL, specimens received on 6 Nov. 1960.

Yaeyama Is., Iriomote-jima I. (西表島), Sonai (祖納): ZUMT 55809 (3), 37.2–38.1 mm SL, 5 July 1971; Amitori Bay (網取湾): ZUMT 55206 (33), 34.4–42.6 mm SL, 21 Aug 1985, H. Kohno and M. Sakamaki.

Ryukyu Archipelago

Locality details unknown: ZUMT 32704, 41.5 mm SL.

Japan: ZUMT P-116, 53.4 mm SL, 24 Apr. 1937.

Remarks: The collection locality, written as “Kume (久米) NW 10”, may refer to Kume Island (Okinawa Prefecture), but cannot be substantiated.

[Philippines]

Cebu I.: ZUMT 62035 (separated from ZUMT 55807), 48.6 mm SL, Apr. 1969, Y. Haneda (羽根田弥太).

Detail locality unknown

Probably Japan: ZUMT ABE 55-11, 54.9 mm SL; ZUMT ABE 55-17, 56.4 mm SL; ZUMT ABE 61-1040, 60.7 mm SL; ZUMT ABE 61-1042, 60 mm SL; ZUMT ABE 62-320, 54 mm SL.

Parapriacanthus dispar (Herre, 1935)

[Philippines]

Cebu I.: ZUMT 55807, 62.9 mm SL, Apr. 1969, Y. Haneda.

Parapriacanthus sp.

[Tonga]

Tonga: ZUMT 55806, 53.3 mm SL, Nov. 1971.

Remarks: Distinguishing characters of this specimen do not match those of other known species.

Pempheris Cuvier, 1829 ハタンボ属

Pempheris adusta Bleeker, 1877 リュウキュウハタンボ

[Japan]

Tokyo Met.

Izu Is., Hachijo-jima I.: ZUMT 19167, 114.1 mm SL, 6 July (year unknown), coll. by net (details unknown).

Remarks: Local name: “Isottsuri (イソツツリ)”.

Kagoshima Pref.

Osumi Is. (大隅諸島), Tanega-shima I. (種子島), Nishinoomote, Kamiurata (上浦田): ZUMT 55742, 127.7 mm SL, 25 Aug. 1973, gill net.

Osumi Is., Yaku-shima I. (屋久島), Kamiyaku (上屋久), Kusugawa (楠川): ZUMT 62034 (from ZUMT 55739), 65.8 mm SL, stained, 27 Sept. 1974.

Okinawa Pref.

Okinawa Is., Okinawa I., Onna (恩納): ZUMT 16872, 128.1 mm SL, ZUMT 16873, 112.5 mm SL, S. Tanabe (田辺貞夫); Itoman: ZUMT 17033–17035 (3), 101.4–134.2 mm SL, S. Tanabe; ZUMT 55787, 106.4 mm SL, ZUMT 55788, 64.7 mm SL, 2 May 1964, Y. Haneda.

Yaeyama Is., Ishigaki-jima I.: ZUMT 55803, 122.0 mm SL, 2 Nov. 1967, marketed.
Yaeyama Is., Iriomote-jima I.: ZUMT 55442 (134), 8.0–38.3 mm SL, 13 July 1986, H. Kishimoto.

[Taiwan]

Pengfu: ZUMT 37425, 87.7 mm SL, July 1906.

[Philippines]

Detail locality unknown: ZUMT 25487, 125.4 mm SL, A.W. Herre.

[Malaysia]

Mersing, Pulau Babi Kechil: ZUMT 55723–55737 (15), 78.0–120.0 mm SL, 26 Nov. 1972.

[Papua New Guinea]

Manam I.: ZUMT 55719, 138.2 mm SL, ZUMT 55720, 122.5 mm SL, female, 20 Oct. 1969, Y. Haneda, R/V Tagula.

Remarks: The collection locality appears to have been misspelt (“Manana” instead of “Manam”), but the possibility exists that the locality may have been confused with Bagana volcano (Bouganville I.). R/V Tagula was a research vessel of Department of Agriculture Stock and Fisheries at Port Moresby (Haneda and Tsuji, 1971).

[Seychelles]

Mahé: ZUMT 62042 (previously uncataloged), 83.9 mm SL, 9 Sept. 1954.

[Probably Pacific Ocean]

Locality unknown: ZUMT 62043 (4; previously uncataloged), 109.5–128.6 mm SL.

Remarks: This species is widely distributed from the Indian to Pacific Oceans, the Indian Ocean population having black pigmentation on the anal-fin outer margin. The present specimens lacked this character.

Pempheris compressa (Shaw, 1790)

[Australia]

New South Wales

Calloroy: ZUMT 55794, 92.2 mm SL, 12 Feb. 1992, rocky shore.

Pempheris japonica Döderlein, 1883

[Japan]

Chiba Pref.

Tateyama, Okinoshima (沖ノ島): ZUMT 55792 (17), 49.5–73.5 mm SL, 29 Sept. 1972.

Tokyo Met.

Izu Is., Miyake-jima Island (三宅島), Abeno-hama Beach (アベノ浜): ZUMT 55749, 131.5 mm SL.

Izu Is., Hachijo-jima Island, Taredo Beach (垂れ戸海岸): ZUMT 55800 (6), 31.7–46.1 mm SL, 20 July 1969; detail locality unknown: ZUMT 19302, 135.5 mm SL, ZUMT 19382, 153.4 mm SL, Y. Oshitsu (押津義雄); ZUMT 55755, 138.1 mm SL, ZUMT 55756, 126.2 mm SL, May 1961.

Tokyo Market (collection details unknown): ZUMT 12748, 132.5 mm SL.

Kanagawa Pref.

Miura, Misaki, Koajiro (小網代): ZUMT 54650 (3), 23.6–29.1 mm SL, 7 Sept. 1966; detail locality unknown: ZUMT 3670, 131.2 mm SL, ZUMT 3671, 130.7 mm SL, ZUMT 12749, 134.1 mm SL, sketch number 171 (写生 171 号), probably S. Tanaka; ZUMT 40293, 107.3 mm SL.

Manazuru: ZUMT P-446–449 (4), 84.9–88.3 mm SL, Sept. or Oct. 1960; ZUMT P-472, 88.1 mm SL, 25 Sept. 1960; ZUMT P-494, 128.6 mm SL, ZUMT P-495, 141.0 mm SL, Aug. or Sept. 1960; ZUMT P-519, 98.6 mm SL, ZUMT P-522, 109.5 mm SL, 25 Dec. 1960.

Wakayama Pref.

Kushimoto: ZUMT 55799, 36.3 mm SL, 4 Sept. 1970.

Remarks: The specific collection locality, written as “Kii-takahama (紀伊高浜)”, could not be determined.

Hirokawa (広川), Hiro (広): ZUMT 8172, 103.8 mm SL, I. Hoshino.

Miyazaki Pref.

Nobeoka, Totoro: ZUMT 51965, 117.7 mm SL, 10 Oct. 1959; ZUMT 52327, dissected, 10 Sept. 1959; ZUMT P-160, 162–164, 166, 168–170, 173–176, 178, 181, 183–186, 204, 214, 216, 218–222, 225, 226–231 (33), 80.5–137.8 mm, some specimens stained and dissected, 10 Sept. 1959, bottom trawl.

Remarks: Photograph of ZUMT 51965 and internal morphology of ZUMT 52327 figured by Tominaga (1968), respectively.

Kagoshima Pref.

Osumi Is., Tanega-shima I., Nishinoomote, Kamiurata: ZUMT 55743, 114.4 mm SL, 25 Aug. 1973.

Osumi Is., Yaku-shima I., Kusugawa: ZUMT 55740, 68.7 mm SL, ZUMT 55741, 69.4 mm SL, 27 Sept. 1974, H. Ida.

Yamaguchi Pref.

Hagi (萩): ZUMT 6156, 127.1 mm SL, I. Tanaka (田中市郎).

Remarks: Although the collection date of ZUMT 6156 was not recorded on the specimen ledger, it was estimated as having been during the period (1900's to 1930's) when Ichiro Tanaka sent many fish specimens to Shigeo Tanaka.

Tsuno-shima I.: ZUMT 55051, 136.0 mm SL, female, dissected, 23 Aug. 1951.

Nagasaki Pref.

Locality details unknown: ZUMT 27072, 133.5 mm SL.

Okinawa Pref.?

Yaeyama Is., Ishigaki-jima I.?: ZUMT 53349, 87.2 mm SL, Sato.

Remarks: *Pempheris japonica* has previously been recorded in Japanese waters mainly from mainland of Japan south to Kyushu, with only a few individuals reported from Amami-oshima and Okinawa-jima islands (Koeda et al. 2012; Nakae et al. 2018). Although some previous publications, e.g., Hayashi (1984), Hatooka (2000), and Shao et al. (2008), included Taiwan and the Philippines in the distribution of the species, those locations were rejected by Koeda et al. (2012). The last-mentioned cited seasonal differences in juvenile appearance as evidence of possible reproduction of the species at Okinawa Island, but supporting evidence has not been forthcoming. Although, the present specimen (ZUMT 53349) collected from Ishigaki-jima Island based on the ZUMT specimen ledger, the collection locality is seriously doubtful, because that a single specimen (ZUMT 53211) of *Sardinops melanostictus* (Temminck & Schlegel, 1846)(Clupeidae) was also discovered from the same specimen series.

Detail locality unknown

Probably Japan: ZUMT P-167, dissected, 10 March? 1989; ZUMT ABE 59-588 (2), 60-1521, 60-1581, 6209, 72.6–120.6 mm SL; ZUMT ABE 62-262–62-268 (7), 68.6–125.8 mm SL; ZUMT ABE 62-314–62-319 (6), 87.5–110.3 mm SL.

Pempheris mangula Cuvier, 1829

[Indian Ocean]

Detail locality unknown: ZUMT 55961 (10), 20.4–29.0 mm SL.

Remarks: Identified on the basis of pored lateral-line scale counts, but the similarities with *Pempheris nesogallica* Cuvier, 1831 which has similar counts, need further investigation.

Pempheris molucca Cuvier, 1829

[Indonesia]

Sulawesi, Makassar: ZUMT 55721, 80.9 mm SL, ZUMT 55722, 80.7 mm SL, Nov. 1969, Y. Haneda, marketed.

[Malaysia]

Borneo, Sarawak: ZUMT 52328, dissected, ZUMT 52329, 103.1 mm SL, ZUMT 52330, 112.7 mm SL, Sarawak Museum.

Pempheris nesogallica Cuvier, 1831

[Kenya]

Shimoni: ZUMT 62041 (previously uncataloged), 54.8 mm SL.

[South Africa]

Durban: ZUMT 62040 (previously uncataloged), 78.9 mm SL.

Pempheris nyctereutes Jordan & Evermann, 1902 タカサゴハタンボ

Remarks: The Japanese name “Takasago-hatampo” was proposed by Tominaga (1963), although the species has at no time been recorded from Japanese waters (see remarks for *P. sasakii*).

[Taiwan]

Keelung (基隆): ZUMT 19048, 122.2 mm SL, firstly identified at 22 June 1929, H. Sato (佐藤春吉).

Remarks: Photograph of ZUMT 19048 figured by Tominaga (1968) as a homotype.

Pengfu (澎湖): ZUMT 42902, 160.5 mm SL, **holotype**, female.

Remarks: The collection locality, written as “Hokoto” in the specimen ledger and original description (Jordan and Evermann, 1902), was believed to be Hokuto [Taipei City] by Ho and Shao (2011). However, “Hokoto” is the Japanese name for the Pengfu Islands (澎湖諸島), further evidence of the correct locality being given by Jordan and Evermann (1902), who noted that Hokoto was also referred to as “Pescadores”, another name for Pengfu. Although Ho and Shao (2011) believed the holotype to be lost, citing a pers. comm. from Kazuo Sakamoto (24 Oct. 2007), it is herein confirmed as available.

Pempheris oualensis Cuvier, 1831 ヌメハタンボ

[Papua New Guinea]

Rabaul: ZUMT 55793 (79), 20.6–49.2 mm SL.

Pempheris sasakii Jordan & Hubbs, 1925 ミエハタンボ

Remarks: Hayashi (1984) synonymized this species under *P. nyctereutes*, being widely followed [e.g., Hatooka and Yagishita (2013), Koeda (2018ab, 2020)]. Because the validity of the species is expected to be confirmed in future (K. Koeda, unpubl.), *P. sasakii* is tentatively used here.

[Japan]

Kanagawa Pref.

Miura, Aburatsubo, near Marine Biological Station of Faculty of Science (東大理学部附属
実験所付近): ZUMT 48293, 119.9 mm SL, around 1935?, T. Abe.

Manazuru: ZUMT P-133, 102.8 mm SL, ZUMT P-134, 109.6 mm SL, Aug. 1959, T. Abe.

Shizuoka Pref.

Itou (伊東), Usami (宇佐美): ZUMT 33016, 67.7 mm SL, 7 Dec. 1933, donated from Izu
Usami Elementary School (伊豆宇佐美小学校) to S. Tanaka.

Mie Pref.

Toba: ZUMT 51966, 86.7 mm SL, 1963, Y. Tominaga.

Wakayama Pref.

Locality details unknown: ZUMT ABE 9595, 117.4 mm SL, 14 Oct. 1953.

Miyazaki Pref.

Nobeoka, Totoro: ZUMT 52159, 104.1 mm SL, ZUMT 52160, 107.2 mm SL, 4 Aug. 1960;
ZUMT 52192, 97.6 mm SL, Aug. 1960, donated from Fisheries Experimental Station of
South Sea Area (南海区水試令所); ZUMT 52326, dissected.

Remarks: Internal morphology of ZUMT 52326 figured by Tominaga (1968).

Fukushima: ZUMT 22662, 133.9 mm SL, ZUMT 22667, donated from Fukushima-mura
Fisheries Association (福島村漁業組合).

Kagoshima Pref.

Osumi Is., Yaku-shima I., Kamiyaku, Kusugawa (楠川): ZUMT 62033 (from ZUMT 55739),
70.2 mm SL, 27 Sept. 1974.

Detail locality unknown

Probably Japan: ZUMT ABE 61-1104, 104.2 mm SL.

Pempheris schomburgkii Müller & Troschel, 1848

[Western Atlantic Ocean]

Locality details unknown: ZUMT 55802, 26.0 mm SL, stained.

Pempheris schwenkii Bleeker, 1855 ミナミハタンポ

[Japan]

Kagoshima Pref.

Osumi Is., Tanega-shima I.: ZUMT 28601, 109.0 mm SL, H. Kuroiwa (黒岩 恒).

Osumi Is., Yaku-shima I., Kusugawa: ZUMT 55739 (13), 48.0–65.1 mm SL, 27 Sept. 1974.

Okinawa Pref.

Okinawa Is., Okinawa-jima I., Motobu: ZUMT 51969 (P-288), 105.6 mm SL, Nov. 1960; Chinen: ZUMT 55543, 57.5 mm SL, ZUMT 55544, 52.2 mm SL, 15 Spet. 1986, H. Senou (瀬能 宏); locality details unknown: ZUMT 51970–51973 (4; P289–292), 27.2–64.4 mm SL, 1960.

Yaeyama Is., Ishigaki-jima I.: ZUMT 55795 (5), 63.7–73.2 mm SL, 9 Oct. 1970, obtained from fish market; ZUMT 62036 (from ZUMT 55442), 20.4 mm SL, 13 July 1986, H. Kishimoto.

Pempheris tominagai Koeda, Yoshino & Tachihara, 2014

[Mozambique]

Baxio Pinda: ZUMT 62039 (previously uncataloged), 79.2 mm SL, July 1950.

Pempheris vanicolensis Cuvier, 1831 キビレハタンポ

[Philippines]

Basilan I.: ZUMT 12717, 96.3 mm SL, U. Yamamura (山村樞次郎); ZUMT 42348, 131.9 mm SL, 1926, K. Yamaoka.

Locality details unknown: ZUMT 11090, 145.3 mm SL, U. Yamamura.

Pempheris xanthoptera Tominaga, 1963 ミナミハタンポ

[Japan]

Chiba Pref.

Tateyama: ZUMT 55804 (4), 23.7–34.0 mm SL, 24 Sept. 1959.

Kamogawa, Kominato: ZUMT P-117 (6), 22.4–30.9 mm SL, **paratypes**, 10 Sept. 1954, Yasuda, tide pool; ZUMT P-118 (4), 14.4–19.4 mm SL, **paratypes**, 31 May 1933, tide pool at Matuga-hama (details unknown).

Tokyo Met.

Izu Is., Izu-oshima I., Toushiki (トウシキ): ZUMT 55791 (8), 33.5–42.5 mm SL, **paratypes**, ZUMT 55796 (20), 30.1–42.2 mm SL, **paratypes**, 8 Sept. 1960; detail locality unknown: ZUMT P-502–505 (4), 118.8–119.7 mm SL, middle of Aug. 1960.

Izu Is., Miyake-jima I., Abeno-hama Beach: ZUMT 55750–55754 (5), 90.6–122 mm SL, 22 Sept. 1973, 15 m depth; Kamakata (釜方): ZUMT 55738 (73), 24.8–43.1 mm SL, 21 Sept. 1973, tidepool; locality details unknown: ZUMT 54652 (10), 17.6–20.5 mm SL, 30 July 1972, J. Moyer and Y. Tominaga; ZUMT 55763–55772 (10), 83.2–119.4 mm SL, 1963.

Izu Is., Hachijo-jima Island: ZUMT 19138, 115.0 mm SL, **paratype**, 3 July 1929, Y. Otsuki (大槻洋四郎); ZUMT 19166, 126.6 mm SL, **paratype**, 6 July 1929, Y. Otsuki; ZUMT 19168, 131.4 mm SL, **paratype**, 6 July 1929, Y. Otsuki; ZUMT 41871–41873 (3), 47.8–42.7 mm SL, **paratypes**, Y. Uchiyama (内山吉五郎); ZUMT 46616, 130.0 mm SL, I. Tomiyama; ZUMT 62002 (3; separated from ZUMT 42900), 45.1–50.4 mm SL, Sept. 1922, M. Uchiyama; ZUMT P-525, 127.4 mm SL, left side dissected, 1960.

Ogasawara Is. (小笠原諸島), Chichi-jima I. (父島), Futami Port (二見港): ZUMT 55789 (56), 25.2–60.7 mm SL, 16 Aug. 1974; Miyano-hama Beach (宮之浜): ZUMT 55797 (3), 16.6–25.0 mm SL, 20 July 1969, H. Ida (井田 齊); ZUMT 55801 (56), 10.7–23.3 mm SL, 20 July 1969.

Kanagawa Pref.

Miura, Misaki, Koajiuro: ZUMT 49143, 128.1 mm SL, **paratype**, 18 Apr. 1955, I. Tomiyama; ZUMT 49144, 132.5 mm SL, **paratype**, ZUMT 49145, 74.5 mm SL, **paratype**, 19 Aug. 1955, I. Tomiyama; ZUMT 54651 (77), 8.8–20.8 mm SL, 7 Sept. 1966; Misaki Marine Biology Station: ZUMT ABE 571–575 (5), 28.2–42.4 mm SL, Jan. 1936; off Moroiso (諸磯), Ebi-shima I. (エビ島): ZUMT 56866, 26.5 mm SL, ZUMT 56867 (10), 16.9–23.3 mm SL, 1 Aug. 1987, tide pool.

locality details unknown: ZUMT 49438, 88.1 mm SL, **paratype**, I. Tomiyama; ZUMT 62038 (36, previously uncataloged), 14.4–28.6 mm SL, 2 Sept. 1986, Sato.

Hayama (葉山): ZUMT 27230, 31.0 mm SL, Sept. 1933.

Manazuru: ZUMT 51967, 116.8 mm SL, **holotype**, 25 Sept. 1960; ZUMT 55050 (P-520), 115.0 mm SL, **paratype**, dissected, 15–20 Oct. 1960; ZUMT P-127–132 (6), 75.1–125.6 mm SL, Aug. or Sept. 1959; ZUMT P-252, 98.7 mm SL, 23 June 1960, T. Abe; ZUMT P-450–458 (9), 72.2–120.6 mm SL, some specimens stained, Sept. or Oct. 1960; ZUMT P-461–466, 468–471 (10), 47.4–124.2 mm SL, 15–20 Oct. 1960; ZUMT P-475–478, 480–490 (15), 77.3–95.9 mm SL, 25 Sept. 1960; ZUMT P-496–500 (5), 63.5–132.2 mm SL, Aug. or Sept. 1960; ZUMT P-524, 61.1 mm SL, 9 Nov. 1960; ZUMT ABE 62-1230, 90.2 mm SL, ZUMT ABE 62-1233, 89.2 mm SL, 22 Sept. to 5 Oct. 1962.

Shizuoka Pref.

Shimoda (下田): ZUMT 42412 (18), 10.6–16.2 mm SL, 25 Oct., K. Kato (加藤光次郎); ZUMT 55790 (13), 27.6–39.9 mm SL.

Remarks: Although the collection date of ZUMT 42412 was not recorded in the specimen ledger, it is estimated to have been during the period 1932 to 1941, when Kojiro Kato (加藤光次郎) worked at the Mitsui Institute of Marine Biology (三井海洋生物研究所)(Suzuki 1981).

Mera (妻良): ZUMT 55759–55762 (4), 75.0–111.8 mm SL, Oct. 1957, Y. Haneda.

Nirayama? (萑山): ZUMT 37909, 70.7 mm SL, **paratype**, locality details unknown [specimens donated by M. Agata (阿方 勝), Nirayama junior high school (萑山中学校)].

Locality details unknown: ZUMT 44887, 48.4 mm SL, N. Onodera (小野寺直一).

Mie Pref.

Kumano (熊野), Kimoto (木本): ZUMT 23185, 75.8 mm SL, ZUMT 23187, 64.8 mm SL, ZUMT 23186, 88.6 mm SL, 10 May 1930, Y. Tsuchiga (槌賀安平), Kimoto junior high school (木本中学校).

Wakayama Pref.

Kushimoto, Azashi (安指): ZUMT 55774–55786 (13), 78.6–112.7 mm SL, 24 Aug. 1972; Kushimoto Market: ZUMT P-123–126 (4), 66.5–92.1 mm SL, early Aug. 1959, T. Abe; Kii-takahama (details unknown): ZUMT 55798 (5), 21.4–33.2 mm SL, 4 Sept. 1970. Tanabe: ZUMT 8098, 102.4 mm SL, **paratype**, ZUMT 8326, 87.6 mm SL, **paratype**, ZUMT 8327, 101.5 mm SL, **paratype**, N. Ui; ZUMT 20311–20314 (4), 90.9–120.9 mm SL, **paratypes**, Sept. 1921, N. Ui.

Kochi Pref.

Susaki: ZUMT 18643, 74.4 mm SL, **paratype**, 20 July 1925?, T. Kamohara. Okino-shima I. (沖の島), Moshima Port (母島港): ZUMT 55744–55747 (4), 90.3–107.0 mm SL, 26 Aug. 1971, angling.

Miyazaki Pref.

Nobeoka, Totoro: ZUMT 52161–52164 (4), 95.1–111.4 mm SL, **paratypes**, 4 Aug. 1960, set net; ZUMT P-137, 90.4 mm SL, ZUMT P-138, 97.2 mm SL, 2 July 1953; ZUMT P-139–143, 145 (6), 72.7–97.2 mm SL, 10 Sept. 1959; ZUMT P-414, dissected, 4 Aug. 1960. Locality details unknown: ZUMT 20015.

Kagoshima Pref.

Kagoshima, Taniyama (谷山): ZUMT 24054, 44.1 mm SL, **paratype**; ZUMT 48291, 42.0 mm SL, **paratype**, 20 July to 15 Aug. 1930. Remarks: Called “Mebai (メバイ)” in local dialect, but probably incorrect. Kagoshima, Naya (納屋): ZUMT 24142, 76.3 mm SL. Remarks: Label states “Probably Kagoshima”. Osumi Is., Tamega-shima I.: ZUMT 28600, 116.8 mm SL, **paratype**, H. Kuroiwa. Detail locality unknown: ZUMT 26884, 84.5 mm SL, ZUMT 40488, 77.3 mm SL.

Nagasaki Pref.

Saikai (西海), Seto (瀬戸): ZUMT P-507, 509, 510, 511, 513 (5), 56.2–92.4 mm SL, some specimens stained, 9 Nov. 1960, Masu-ami; locality details unknown (外泊). Remarks: Collection locality written as “Nagasaki Pref. (長崎県), Seikai Town (西海町), Sotodomari (外泊)”, but the last-mentioned name/location is not known in Seikai City (previously Town). Nishisonogi-gun (西彼杵郡): ZUMT P-508, 92.1 mm SL, 9 Nov. 1960. Goto Is., Madara-jima I.: ZUMT 50215, 97.2 mm SL, **paratype**, ZUMT 50216, 91.2 mm SL, **paratype**, ZUMT 50217, 87.3 mm SL, **paratype**, 20 Oct. 1953, I. Tomiyama.

Goto Is., Fukue-jima I., Mitsuiraku (三井楽): ZUMT 50060, 102.0 mm SL, **paratype**, 13 Oct. 1953; Fukue: ZUMT 49925, 91.6 mm SL, **paratype**, ZUUMT 49952, 102.4 mm SL, **paratype**, 10 June 1953, I. Tomiyama; Tamanoura, Taiho (大寶): ZUMT 52325, **paratype**, dissected.

Remarks: Internal morphology of ZUMT 52325 figured by Tominaga (1968).

Locality details unknown: ZUMT 2272, 118.8 mm SL, 20 June 1909.

Detail locality unknown

Probably Japan: ZUMT 63257, 121.4 mm SL; ZUMT 63258, 79 mm SL; ZUMT P-119 (17), 13.6–18.4 mm SL; ABE 59-376, 59-587, 59-590 (3), 101.9–126.6 mm SL. ZUMT ABE 61-1105, 89.0 mm SL; ZUMT ABE 61-1106, 94.6 mm SL; ZUMT ABE 61-1107, 91.2 mm SL; ZUMT ABE 61-944, 78.0 mm SL; ZUMT ABE 62-121, 120.4 mm SL; ZUMT ABE 62-122, 119.8 mm SL.

Acknowledgements

We are deeply grateful to the late Y. Tominaga for his dedication and efforts to the ZUMT collection. We are also grateful to H. Hata (National Museum of Nature and Science), I. Abe, S. Fujiwara, A. Inuma, M. Saito, A. Takahashi (Tokyo University of Marine Science and Technology), and H. Ogata (ZUMT) for curatorial assistance. G. S. Hardy (Ngunguru, New Zealand) kindly improved the English in the manuscript. The present study was supported in part by JSPS KAKENHI 21K06313 JP and the Sasakawa Scientific Research Grant from The Japan Science Society (2021-4064) for the first author.

References

- Haneda, Y. and Tsuji, F. I. 1971. Description of some luminous squids from the water of northern New Guinea collected by the R/V Tagula. Science Report of the Yokosuka City Museum, 18: 29–33.
- Hatooka, K. 2000. Pempheridae. Pp. 878–879, 1570–1571. In: Nakabo, T. (ed) Fishes of Japan with pictorial keys to the species, 2nd edition. Tokai University Press, Tokyo.
- Hatooka, K. and Yagishita, N. 2013. Pempheridae. Pp. 983–984, 2020–2021. In: Nakabo, T. (ed) Fishes of Japan with pictorial keys to the species, 3rd edition. Tokai University Press, Hadano.
- Hayashi, M. 1984. Genus *Pempheris*. Pp. 160–161. In: Masuda, H., Amaoka, K., Araga, C., Uyeno, T. and Yoshino, T. (1984) The fishes of the Japanese Archipelago. Tokai University Press, Tokyo. (in Japanese)
- Ho, H.-C. and Shao, K.-T. 2011. Annotated checklist and type catalog of fish genera and species described from Taiwan. Zootaxa, 2957: 1–74.
- Koeda, K. 2017. Fishes of family Pempheridae (Teleostei: Perciformes) of the Ogasawara Islands, Japan. Bulletin of the Biogeographical Society of Japan, 72: 1–13.
- Koeda, K. 2018a. Pempheridae. Pp. 298–299. In: Nakabo, T. (ed) The Natural History of the Fishes of Japan. Shogakukan, Tokyo.

- Koeda, K. 2018b. Pempheridae. Pp. 339–343. In: Koeda, K., Hata, H., Yamada, M. and Motomura, H. (eds) Field guide to fishes landed at Uchinoura Fishing Port, Kagoshima, Japan. The Kagoshima University Museum, Kagoshima.
- Koeda, K. 2020. Pempheridae. Pp. 406–411. In: Koeda, K., Hata, H., Yamada, M. and Motomura, H. (eds) Fishes from markets in Osumi Peninsula, Kagoshima, Japan. The Kagoshima University Museum, Kagoshima.
- Koeda, K., Imai, H., Yoshino, T. and Tachihara, K. 2010a. First and northernmost record of *Pempheris oualensis* (Pempheridae), from Ryukyu Archipelago, Japan. *Biogeography*, 12: 71–75.
- Koeda, K. and Motomura, H. 2017. A new species of *Pempheris* (Perciformes: Pempheridae) endemic to the Ogasawara Islands, Japan. *Ichthyological Research*, 65 (1): 21–28. DOI 10.1007/s10228-017-0586-3
- Koeda, K., Yoshino, T., Imai, H. and Tachihara, K. 2010b. Description of new Japanese and northernmost record of a pempherid fish, *Pempheris vanicolensis*, from Iriomote Island, southern Ryukyu Archipelago. *Biogeography*, 12: 77–82.
- Koeda, K., Yoshino, T. and Tachihara, K. 2012. First and southernmost records of *Pempheris japonica* (Pempheridae) from Okinawa Island with the description of juvenile growth. *Bulletin of the Biogeographical Society of Japan*, 67: 65–73.
- Koeda, K., Yoshino, T. and Tachihara, K. 2013a. *Pempheris ufuagari* sp. nov., a new species in the genus *Pempheris* (Perciformes, Pempheridae) from the oceanic islands of Japan. *Zootaxa*, 3609: 231–238.
- Koeda, K., Yoshino, T. and Tachihara, K. 2013b. Identificational keys of *Pempheris adusta* Bleeker, 1877 (Pempheridae) with comments on its standard Japanese name. *Zootaxa*, 3609: 231–238. (in Japanese)
- Kimura, Y., Hibino, Y., Miki, R., Minetoma, T. and Koeda, K. (eds) 2017. Field guide to fishes of Kuchinoerabu-jima Island in the Osumi Group, Kagoshima, southern Japan. The Kagoshima University Museum, Kagoshima. 200 pp.
- Nakae, M., Motomura, H., Hagiwara, K., Senou, H., Koeda, K., Yoshida, T., Tashiro, S., Jeong, B., Hata, H., Fukui, Y., Fujiwara, K., Yamakawa, T., Aizawa, M., Shinohara, G. and Matsuura, K. 2018. An annotated checklist of fishes of Amami-oshima Island, the Ryukyu Islands, Japan. *Memoirs of the National Museum of Nature and Science*, Tokyo, 52: 205–361.
- Shao, K.-T., Ho, H.-C., Lin, P.-L., Lee, P.-F., Lee, M.-Y., Tsai, C.-Y., Liao, Y.-C., Lin, Y.-C., Chen, J.-P. and Yeh, H.-M. 2008. A checklist of the fishes of Southern Taiwan, northern South China Sea. *Raffles Bulletin of Zoology*, Supplement, 19: 233–271.
- Suzuki, M. 1981. In memory of Prof. Dr. Kojiro KATO during 1928–1950. *Japanese Society of Systematic Zoology*, 54: 5–10.
- Tanaka, S. 1911. Figures and descriptions of the fishes of Japan, including Riukiu Islands, Bonin Islands, Formosa, Kurile Islands, Korea and southern Sakhalin. Vol. 1: 1–18, pls. 1–5. [In Japanese and English]
- Tominaga, Y. 1963. A revision of the fishes of the family Pempheridae of Japan. *Journal of the Faculty of Science, University of Tokyo Section IV Zoology*, 10 (1): 269–290.

- Tominaga, Y. 1965. The internal morphology and systematic position of *Leptobrama mülleri*, formerly included in the family Pempheridae. Japanese Journal of Ichthyology, 12 (3): 33–56.
- Tominaga, Y. 1968. Internal morphology, mutual relationships and systematic position of the fishes belonging to the family Pempheridae. Japanese Journal of Ichthyology, 15 (2): 43–95.
- Tominaga, Y. 1986. The relationships of the families Glaucosomatidae and Pempheridae. Pp. 595–599. In: Uyeno, T., Arai, R., Taniuchi, T. and Matsuura, K. (eds) Indo-Pacific fish biology. Proceedings of the Second International Conference on Indo-Pacific Fishes. Ichthyological Society of Japan, Tokyo.
- Uyeno, T. 1994. Dr. Yoshiaki Tominaga (1936–1994). Japanese Journal of Ichthyology, 41 (3): 351.

A list of Clupeiformes (Actinopterygii: Teleostei) specimens deposited in the Department of Zoology, The University Museum, The University of Tokyo

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Abstract

Clupeiformes specimens deposited in the Department of Zoology, The University Museum, The University of Tokyo, comprising 1,143 lots with 2,267 specimens (including the paratype of *Thrissina katana* Hata, Lavoué & Motomura, 2022) of 75 species representing six families, are listed.

Introduction

The order Clupeiformes includes more than 400 species, often commonly called sardines or anchovies (Birge et al. 2021). The order includes many species important for fisheries, such as *Engraulis japonica* Temminck & Schlegel, 1846 and *Sardinops melanostictus* (Temminck & Schlegel, 1846), of which more than 150,000 tons are caught every year in Japan (Statistics Department of Ministry of Agriculture, Forestry and Fisheries, Japan 2021). On the other hand, Clupeiformes is considered to be a taxonomically confused group due to numerous new species having been described in recent years (e.g., Stern et al. 2016; Gangan et al. 2020; Hata et al. 2021a, b), and suggested re-classification of higher-level taxa (including family or subfamily taxa) by many studies (e.g., Lavoué et al. 2017; Egan et al. 2018). As an aid to future taxonomic studies, a list of clupeiform specimens deposited in the Department of Zoology, The University Museum, The University of Tokyo, including seventy-five species, is provided.

Materials and Methods

The classification of Clupeiformes families generally follows Bloom and Egan (2018). However, despite their recognition of the polyphyly of “Clupeidae”, their “Alosinae”, “Dorosomatinae”, and “Clupeinae” are included here as a single family, “Clupeidae”. Genera and species represented in this study are arranged in alphabetical order by species name, the correspondence between scientific name and standard Japanese name of each family following

Aonuma and Yagishita (2013a–c), Hata and Koeda (2022), Hata and Motomura (2020a, b, 2021a), and Hata et al. (2022). Species nomenclature and identifications of ZUMT specimens generally followed Whitehead (1985), Whitehead et al. (1988), Munroe et al. (1999) and Wongratana et al. (1999), exceptions being noted in the Remarks following applicable species. 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 in this study are stored in rooms 406 and 407 in the museum building, generally in shelved bottles, with 13 larger specimens [ZUMT 18101, 18505, 18506, 45931, 50525, 50602 (*Ilisha elongata*), 19100, 21227 (*Tenualosa reevesii*), 47849, 47850 (*Clupea pallasii*), 51459 (*Chirocentrus dorab*), 62047 (*Chirocentrus nudus*), 62050 (*Alosa alosa*)] in a glass tank (labelled “Clupeidae 43-A”), sealed with a silicon adhesive and glass lid, in room 407 (as of Dec. 2021).

The standard lengths of specimens were generally measured for each specimen, although only of the largest and smallest specimens when a large number were included in a single lot. Some specimens in the ZUMT collection, collected by Dr. Tokiharu Abe, had neither allotted ZUMT catalog numbers, nor collection data recorded. Such specimens are herein listed as ZUMT ABE XXXX (number written on the label), since there remains the possibility Dr. Abe’s personal catalog book with collection data will be discovered in the future. Additionally, specimens with catalogue numbers ZUMT ABE 2700 to 6000 were collected from Palau by Dr. Abe between 1936 and 1937 (per K.K. and M.A.).

Results

At least 75 Clupeiformes species, in 1143 lots including 2,267 specimens, were found in the ZUMT fish collection. Some specimens were considered as cryptic or undescribed species (see Remarks).

Species accounts

Clupeiformes ニシン目
Spratelloididae キビナゴ科

Spratelloides delicatulus (Bennet, 1832) ミナミキビナゴ

JAPAN

ZUMT 17090 (1, 46.2 mm; Itoman City, Okinawa Pref.; coll. by S. Tanabe)
ZUMT 17266 (7, 26.0–44.5 mm; Unten, Nakijin Village, Okinawa Pref.; coll. by S. Tanabe)
ZUMT 18305 (2, 46.3–48.9 mm; off Unten Port, Nakijin Village, Okinawa Pref.; 22 May 1927; coll. by Okinawa Prefectural Fisheries Experimental Station)
ZUMT 20047 (1, 44.7 mm; Onna Village, Okinawa Pref.)
ZUMT 40735 (1, 56.8 mm), ZUMT 40736 (1, 54.8 mm), ZUMT 40737 (1, 54.3 mm), ZUMT 40738 (1, 48.7 mm; Amami-oshima Island, Ryukyu Archipelago; coll. by K. Enokiya)
ZUMT 41185 [3, 50.9–53.9 mm; probably Amami-oshima Island, Ryukyu Archipelago; donated by K. Enokiya (Kagoshima Prefectural Oshima Junior High School)]

PHILIPPINES

ZUMT 47003 (1, 43.7 mm), ZUMT 47004 (1, 48.7 mm), ZUMT 47005 (1, 54.2 mm; Philippines; 1926; coll. by U. Yamamura; originally included in ZUMT 42031)

PALAU

ZUMT ABE 3779 (1, 48.3 mm), ZUMT ABE 3780 (1, 49.2 mm), ZUMT ABE 3781 (1, 48.2 mm), ZUMT ABE 3782 (1, 43.9 mm), ZUMT ABE 3805 (14, 25.7–56.8 mm), ZUMT ABE 5963 (1, 45.0 mm; Palau)
ZUMT 62022 (2, 63.4–64.6 mm; Palau; stored in same bottle with ZUMT ABE 5963 and 5964)

LOCALITY UNKNOWN

ZUMT 55114 (9, 42.7–51.6 mm; no data).

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

JAPAN

IZU ISLANDS ZUMT 44926 (46, 34.6–75.9 mm), ZUMT 44930 (35, 46.4–76.2 mm; Hachijo-jima Island)

SHIZUOKA PREF. ZUMT 33349 (1, 95.6 mm), ZUMT 33350 (1, 92.0 mm), ZUMT 33351 (1, 94.0 mm; Shizuoka Pref.)

WAKAYAMA PREF. ZUMT 22003 (1, 78.1 mm; Wakayama Pref.; Jan. 1920)

ZUMT 52386 (93, 21.7–28.8 mm; Yuasa Bay, Yuasa Town; Mar. 1919; coll. by S. Kojima)

EHIME PREF. ZUMT 32470 (1, 70.1 mm), ZUMT 32471 (1, 74.1 mm), ZUMT 32472 (1, 67.7 mm), ZUMT 32473 (1, 77.0 mm), ZUMT 32474 (1, 75.0 mm), ZUMT 32475 (1, 79.0 mm), ZUMT 32476 (1, 77.0 mm; Uwajima City)

KOCHI PREF. ZUMT 18705 (1, 70.5 mm), ZUMT 18706 (1, 75.1 mm; Kashiwa-jima Island, Otsuki Town; Aug. 1928; coll. by T. Kamohara)

ZUMT 47234 (1, 53.3 mm; Kochi Pref.)

NAGASAKI PREF. ZUMT 1585 (105, 28.0–47.0 mm; Fukuda, Nagasaki City; 11 Mar. 1906; coll. by K. Akamatsu)

ZUMT 1625 (11, 42.3–57.2 mm; Izuhara Bay, Tsumi City, Tsumi Island, Nagasaki Pref.; Feb. 1891)

ZUMT 20584 (1, 64.7 mm), ZUMT 20585 (1, 80.0 mm), ZUMT 20586 (1, 70.5 mm), ZUMT 26826 (1, 52.3 mm), ZUMT 29799 (1, 68.1 mm), ZUMT 33773 (1, 72.2 mm), ZUMT 33774 (1, 69.3 mm), ZUMT 33775 (1, 71.2 mm), ZUMT 33776 (1, 64.3 mm), ZUMT 33777 (1, 65.6 mm), ZUMT 33778 (1, 67.2 mm; Nagasaki Pref.; Mar. 1909; coll. by S. Tanaka)

ZUMT 48225 (1, 77.8 mm), ZUMT 48226 (1, 72.5 mm), ZUMT 48227 (1, 83.4 mm), ZUMT 48228 (1, 69.7 mm), ZUMT 48229 (1, 74.7 mm), ZUMT 48230 (1, 72.8 mm), ZUMT 48231 (84.4 mm), ZUMT 48232 [61.4 mm; Tamanoura, Goto City (Fukue-jima Island, Goto Islands); 23 May 1953; coll. by I. Tomiyama]

ZUMT 49886 (1, 82.8 mm), ZUMT 49887 (1, 82.8 mm), ZUMT 49906 [1, 81.5 mm SL; Fukue, Goto City (Fukue-jima Island, Goto Islands); 10 June 1953; coll. by I. Tomiyama] ZUMT 52382 (8, 43.1–54.0 mm; Nagasaki Pref.; Feb. 1912)

KAGOSHIMA PREF. ZUMT 29700 (1, 60.3 mm), ZUMT 29701 (1, 60.9 mm; Naze, Amami City, Amami-oshima Island, Ryukyu Archipelago; 2 July 1910)

ZUMT 46969 (82, 44.8–83.9 mm; Koniya Market, Setouchi Town, Amami-oshima Island, Ryukyu Archipelago)

OKINAWA PREF. ZUMT 16926 (1, 53.4 mm), ZUMT 20051 (1, 57.5 mm), ZUMT 20052 (1, 50.4 mm), ZUMT 20053 (1, 58.7 mm), ZUMT 20054 (1, 45.2 mm), ZUMT 20055 (1, 57.3 mm; Onna Village, Okinawa-jima Island; coll. by S. Tanabe)

ZUMT 17257 (1, 65.1 mm), ZUMT 17258 (1, 61.9 mm; Unten, Nakijin Village, Okinawa-jima Island; coll. by S. Tanabe)

ZUMT 18312 (22, 38.1–58.9 mm; Naha Port, Naha City, Okinawa-jima Island; 25 Aug. 1913; coll. by Okinawa Prefectural Fisheries Experimental Station)

ZUMT 55709 (19, 48.3–69.4 mm; tidepool at Onna Village; 14 Aug. 1925)

ZUMT 63316 (1, 32.9 mm; off Unten Port, Nakijin Village; 22 May 1927; coll. by Okinawa Prefectural Fisheries Experimental Station)

TAIWAN

ZUMT 12849 (1, 62.6 mm), ZUMT 12850 (1, 64.0 mm), ZUMT 12851 (1, 63.8 mm), ZUMT 12852 (1, 56.2 mm; Keelung; coll. by T. Aoki)

PALAU

ZUMT 62020 (2, 62.9–68.8 mm; Palau; stored in same bottle with ZUMT ABE 5963 and 5964)

LOCALITY UNKNOWN

ZUMT 40652 (1, 78.0 mm), ZUMT 40676 [1, 75.5 mm; although the locality was questionably recorded as “Morioka? (盛岡か?)” in the ledger, this species has been recorded from an area south of Ibaraki Pref. on the Pacific coast of Japan (Aonuma and Yagishita 2013a). The ledger record may therefore be erroneous.]

Dussumieriidae ウルメイワシ科 ***Dussumeria acuta* Valenciennes, 1847**

CHINA

ZUMT 22813 (1, 74.1 mm; Hainan Island)

Dussumieria albulina (Fowler, 1934)

PHILIPPINES

ZUMT 40934 (1, 78.8 mm; Jolo Island; Feb. 1909; coll. by K. Aoki and I. Iijima)

ZUMT 42040 (1, 115.9 mm), ZUMT 42170 (1, 118.0 mm), ZUMT 42188 (1, 113.8 mm; Philippines; 1926; coll. by U. Yamamura)

INDONESIA

ZUMT 62607 (1, 1078.1 mm; Jakarta, Java; 5 Mar. 1909; coll. by I. Iijima and K. Aoki)

LOCALITY UNKNOWN

ZUMT 55113 (2, 112.0–122.6 mm; no data)

Remarks. See Hata et al. (2020) regarding the nomenclature of this species.

Dussumieria elopsoides Bleeker, 1849

PHILIPPINES

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

INDONESIA

ZUMT 62628 (1, 102.3 mm; Jakarta, Java; 5 Mar. 1909; coll. by I. Iijima and K. Aoki)

Dussumieria modakandai

Singh, Teena Jayakumar, Kumar, Murali, Mishra, Singh & Lal, 2021

JAPAN

ZUMT 11155 (1, 103.0 mm), ZUMT 11156 (1, 120.4 mm), ZUMT 11157 [1, 120.9 mm; probably Okinawa-jima Island, Ryukyu Archipelago; coll. by S. Sakaguchi (Okinawa Prefectural Daiichi Junior High School)].

TAIWAN

ZUMT 13686 (6, 38.0–46.8 mm; estuary in Tamsui, Xinbei City; coll. by T. Aoki)

ZUMT 14875 (1, 142.5 mm), ZUMT 14876 (1, 143.8 mm), ZUMT 14877 (1, 146.2 mm; Tainan; coll. by T. Aoki)

CHINA

ZUMT 22821 (1, 110.1 mm; Hainan Island)

PHILIPPINES

ZUMT 39500 (1, 108.2 mm), ZUMT 39501 (1, 101.3 mm), ZUMT 39502 (1, 95.2 mm), ZUMT 39503 (1, 101.4 mm), ZUMT 39504 (1, 102.6 mm; Philippines; coll. by U. Yamamura)

Remarks. See Singh et al. (2021) regarding the nomenclature of this species.

Dussumieria sp.

(Fig. 1A)

JAPAN

ZUMT 14468 (1, 137.2 mm), ZUMT 14469 (1, 137.4 mm), ZUMT 39748 (1, 136.9 mm; Okinawa Prefecture; coll. by S. Sakaguchi)

Remarks. These specimens are distinguished from all known congeners by their distinct vomerine teeth.

Etrumeus micropus (Temminck & Schlegel, 1846) ウルメイワシ

JAPAN

AOMORI PREF. ZUMT 13143 (1, 74.6 mm), ZUMT 13144 (1, 76.9 mm SL), ZUMT 13145 (1, 71.3 mm), ZUMT 13146 (1, 72.1 mm), ZUMT 13147 (1, 61.0 mm; Shirogane-maehama, Hachinohe City; 19 Oct. 1923; coll. by S. Tanabe)

ZUMT 41758 (1, 197.6 mm), ZUMT 41769 (1, 181.4 mm; Asamushi, Aomori City; coll. by S. Tanabe)

CHIBA PREF. ZUMT 34252 (1, 47.9 mm; Tateyama Bay; July 1917; coll. by R. Takahashi)

TOKYO MARKET ZUMT 33901 (1, 48.2 mm; probably obtained at Tokyo Market, Tokyo Met.)

KANAGAWA PREF. ZUMT 27237 (1, 86.6 mm), ZUMT 27238 (1, 78.3 mm; Koajiro Bay or Aburatusbo Bay, Miura City; 27 July 1904; coll. by S. Tanaka)

ZUMT 28891 (1, 83.5 mm; Misaki, Miura City; May 1918)

ZUMT 33218 (1, 53.7 mm), ZUMT 33219 (1, 70.5 mm), ZUMT 33220 (1, 67.7 mm), ZUMT 33221 (1, 66.3 mm), ZUMT 33222 (1, 72.4 mm), ZUMT 33223 (1, 60.2 mm; Kozu, Odawara City; 5 Nov. 1933; coll. by K. Minoshima)

ZUMT 21354 (1, 50.9 mm), ZUMT 21355 [1, 48.8 mm; Kanagawa Pref. (Tomioka or Misaki); coll. by S. Fukuda]

ZUMT 55635 (1, 126.1 mm; Misaki Fish Market, Miura City; 29 July 1986)

SHIZUOKA PREF. ZUMT 17752 (1, 72.0 mm), ZUMT 17753 (1, 88.5 mm), ZUMT 17754 (1, 69.3 mm), ZUMT 17755 (1, 69.0 mm; Enoura, Numazu City; coll. by N. Kuroda)

ZUMT 29225 [1, 31.4 mm; probably collected from Shizuoka Pref.; donated by Y. Ito (Shizuoka Junior High School)]

TOYAMA PREF. ZUMT 46274 (1, 121.4 mm), ZUMT 46275 (1, 126.1 mm; probably collected from Uozu or Namerikawa City)

MIE PREF. ZUMT 23203 (1, 69.3 mm), ZUMT 23204 [1, 76.5 mm; probably Mie Pref.; coll. by Y. Tsuchiga (Kimoto Junior High School, Mie Pref.)]

ZUMT 38361 (1, 71.9 mm), ZUMT 38362 (1, 74.2 mm), ZUMT 38363 (1, 75.8 mm), ZUMT 38364 (1, 72.3 mm), ZUMT 38365 (1, 79.2 mm), ZUMT 38366 (1, 75.4 mm), ZUMT 38367 (1, 80.9 mm), ZUMT 38368 (1, 76.9 mm), ZUMT 38369 (1, 78.7 mm), ZUMT 38370 (1, 79.9 mm; Mie Pref. Fisheries Research Institute, Hamajima, Shima City; Sept. 1920)

KYOTO PREF. ZUMT 24371 (1, 97.4 mm), ZUMT 24372 (1, 110.0 mm; Miyazu City,; Nov. 1931; coll. by Kyoto Prefectural Fisheries Training Center)

SHIMANE PREF. ZUMT 2470 (1, 194.1 mm; Hamada City; 2 May 1909)
ZUMT 31318 (1, 95.3 mm; Matsue City)

KOCHI PREF. ZUMT 47209 (1, 47.7 mm), ZUMT 47235 (1, 47.0 mm SL; Kochi Pref.)

NAGASAKI PREF. ZUMT 47932 [1, 55.0 mm; Tamanoura, Goto City (Fukue-jima Island, Goto Islands); 22 May 1953; coll. by I. Tomiyama]

ZUMT 49990 [1, 55.6 mm; Arikawa, Shinkamigoto Town (Nakadori-jima Island, Goto Islands); 10 June 1953; coll. by I. Tomiyama]

ZUMT 50016 [1, 131.6 mm; Fukue, Goto City (Fukue-jima Island, Goto Islands); 12 Oct. 1953; coll. by I. Tomiyama]

ZUMT 50328 (1, 112.4 mm; Hirado City; 10 June 1953; coll. by I. Tomiyama)

MIYAZAKI PREF. ZUMT 22385 (1, 157.5 mm; Miyazaki Pref.)

KAGOSHIMA PREF. ZUMT 5797 (1, 145.1 mm; Shibushi; 25 Oct. 1902)

ZUMT 20042 (1, 118.8 mm), ZUMT 21964 (1, 112.4 mm; Kagoshima Pref.)

TAIWAN

ZUMT 12829 (1, 114.5 mm), ZUMT 12830 (1, 102.5 mm), ZUMT 12831 (1, 93.9 mm; Keelung; coll. by T. Aoki)

ZUMT 13678 (1, 155.9 mm), ZUMT 13679 (1, 81.0 mm; Taiwan; coll. by T. Aoki)

ZUMT 25132 (1, 98.2 mm), ZUMT 25134 (1, 94.3 mm; Port of Keelung, Keelung; coll. by M. Imai)

ZUMT 63272 (1, 70.2 mm; Tamsui, Xinbei City)

LOCALITY UNKNOWN

ZUMT 55115 (5, 99.8–107.4 mm), ZUMT 55116 (2, 108.2–185.9 mm), ZUMT 62084 (6, 50.0–60.7 mm), ZUMT ABE 59-263 (1, 153.1 mm), ZUMT ABE 61-984 (1, 116.9 mm; no data)

Remarks. See Randall and DiBattista (2012) regarding the nomenclature of this species.

***Etrumeus wongratanai* DiBattista, Randall & Bowen, 2012**

ZUMT 12304 (1, 48.9 mm; probably African coast; donation from British Museum)

Remarks. See DiBattista et al. (2012) regarding the nomenclature of this species.

Pristigasteridae ヒラ科

***Ilisha elongata* (Anonymous, 1830) ヒラ**

JAPAN

ARIAKE SEA ZUMT 18101 (1, 428.0 mm; Ariake Sea; coll. by Fukuoka Prefectural Fisheries Experimental Station)

ZUMT 18505 (1, 378.9 mm), ZUMT 18506 [1, 317.8 mm; probably collected from Ariake Sea; 11 Nov. 1928; donated by T. Fukunaga (Fukuoka Prefectural Fisheries Experimental Station)]

ZUMT 18508 (4, 51.8–58.0 mm), ZUMT 18509 [4, 74.4–100.9 mm; probably collected from Ariake Sea; 20 Aug. 1928; donated by T. Fukunaga (Fukuoka Prefectural Fisheries Experimental Station)]

ZUMT 35732 (1, 57.0 mm), ZUMT 35733 (1, 57.5 mm), ZUMT 35734 (1, 44.3 mm), ZUMT 35735 (1, 29.0 mm; Ariake Sea; Oct. 1931; coll. by I. Tomiyama)

ZUMT 45931 (1, 314.1 mm), ZUMT 45944 (1, 268.2 mm; probably Ariake Sea, Japan)

ZUMT 50525 (1, 352.3 mm; Ariake Sea; 19 Apr. 1959; coll. by Y. Tominaga)

FUKUOKA PREF. ZUMT 35100 (1, 148.7 mm), ZUMT 35101 (1, 130.8 mm; Ariake Sea, off Okinohata, Yanagawa City; 28 May 1931; coll. by I. Tomiyama)

ZUMT 50719 (1, 177.3 mm; purchased at Okinohata Fish Market, Yanagawa City; 10 Apr. 1959; coll. by Y. Tominaga)

ZUMT 62107 (16, 21.9–64.7 mm), ZUMT 62108 (5, 58.1–67.3 mm; Yanagawa City; 1931; coll. by I. Tomiyama)

SAGA PREF. ZUMT 57348 (2, 54.1–61.0 mm; purchased at Kashima Fish Market, Kashima City; 22 Sept. 1987; coll. by H. Senou and T. Saruwatari)

ZUMT 57358 (1, 79.2 mm; Nanaura, Kashima City; 23 Sept. 1987; coll. by H. Senou and T. Saruwatari)

NAGASAKI PREF. ZUMT 47990 (1, 217.4 mm; obtained at Sasebo Fish Market, Sasebo City; 28 May 1953; coll. by I. Tomiyama)

EAST CHINA SEA

ZUMT 50555 (1, 275.0 mm; East China Sea; 28 July 1959; coll. by Y. Tominaga)

ZUMT 50602 (1, 363.0 mm; East China Sea, coll. by Y. Tominaga)

ZUMT 51288 [1, 148.8 mm; East China Sea (landed at Fukuoka Fish Market); 24 Dec. 1959; coll. by Y. Tominaga]

ZUMT 62086 (2, 165.2–213.1 mm; East China Sea; 22 Mar. 1963)

TAIWAN

ZUMT 19029 (1, 215.1 mm; Taipei; coll. by H. Sato)

CHINA

ZUMT 15761 (1, 115.3 mm; Fuzhou City, Fujian District)

ZUMT 21224 (1, 232.9 mm; China)

ZUMT 51665 (1, 256.7 mm; East China Sea, east of Shanghai (31°25'N, 124°25'E–30°25'N, 124°25'E))

ZUMT 54563 (1, 190.8 mm), ZUMT 54564 [1, 193.4 mm; Yellow Sea, east of Yanchong City, Jiangsu Province (34°15'N, 122°15'E), 25 m depth; 12 Oct. 1984; coll. by S. Tanabe]

LOCALITY UNKNOWN

ZUMT 37504 (1, 182.0 mm), ZUMT 37505 (1, 186.4 mm), ZUMT 57343 (7, 47.4–59.2 mm; no data)

***Ilisha kampeni* (Weber & de Beaufort, 1913)**

MALAYSIA

ZUMT 62101 (1, 112.0 mm; Sarawak State; tagged as “P. 1661”)
ZUMT 62102 (1, 127.7 mm; Sarawak State; tagged as “P. 1662”)
ZUMT 62103 (1, 85.1 mm; Sarawak State; tagged as “P. 2157”)

***Ilisha megaloptera* (Swainson, 1838)**

MALAYSIA

ZUMT 62098 (1, 137.6 mm; Sarawak State; tagged as “P. 2162”)
ZUMT 62099 (1, 158.7 mm; Sarawak State; tagged as “P. 1875”)
ZUMT 62100 (1, 131.0 mm; Sarawak State; tagged as “P. 1802”)

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

TAIWAN

ZUMT 14914 (1, 79.4 mm), ZUMT 14915 [(1, 75.2 mm; probably collected from Taiwan, donated by T. Aoki (Government-General of Taiwan))]
ZUMT 14938 (1, 115.0 mm; Tainan; coll. by T. Aoki)

***Opisthopterus valenciennesi* Bleeker, 1872**

TAIWAN

ZUMT 14973 (1, 146.5 mm SL; Tainan; coll. by T. Aoki)

LOCALITY UNKNOWN

ZUMT 39383 [1, 227.6 mm; locality unknown (labelled as southern Japan, but probably in error)]

***Pellona ditchela* Valenciennes, 1847**

PHILIPPINES

ZUMT 42236 (1, 123.9 mm; Philippines; 1926; coll. by U. Yamamura)
ZUMT 42353 (1, 130.9 mm; Basilan; 1926; coll. by U. Yamamura)

Chirocentridae オキイワシ科
***Chirocentrus dorab* (Fabricius, 1775) オキイワシ**

JAPAN

NAGASAKI PREF. ZUMT 8346 (1, 380.7 mm; probably collected from Nagasaki Pref.; coll. by I. Kaneko, Nagasaki Pref.)

KAGOSHIMA PREF. ZUMT 24005 (1, 170.9 mm), ZUMT 24006 (1, 135.4 mm), ZUMT 24007 (1, 162.5 mm; Shibushi City)

EAST CHINA SEA

ZUMT 51459 (1, 495.0 mm; East China Sea; 22 Sept. 1959)

LOCALITY UNKNOWN

ZUMT 22310 (1, 191.3 mm; no data)

***Chirocentrus nudus* Swainson, 1839**

LOCALITY UNKNOWN

ZUMT 62047 (1, 488.8 mm), ZUMT 62112 (1, 280.2 mm), ZUMT 62113 (1, 275.8 mm; no data)

Engraulidae カタクチイワシ科
***Coilia brachygnathus* Kreyenberg & Pappenheim, 1908**

CHINA

ZUMT 22732 (1, 215.8 mm), ZUMT 22733 (1, 169.9 mm; Wuchang District, Wuhan City, Hubei Province)

ZUMT 25428 (1, 233.3 mm SL), ZUMT 25429 (1, 260.3 mm; China)

***Coilia coomansi* Hardenberg, 1934**

MALAYSIA

ZUMT 62093 (1, 112.8 mm; Sarawak State; tagged as “P. 2135”)

ZUMT 62094 (1, 119.3 mm; Sarawak State; tagged as “P. 2136”)

ZUMT 62095 (1, 101.8 mm; Sarawak State; tagged as “P. 2335”)

ZUMT 62096 (1, 110.9 mm; Sarawak State; tagged as “P. 1996”)

ZUMT 62097 (1, 117.4 mm; Sarawak State; tagged as “P. 1997”).

Coilia macrogathos Bleeker, 1852

MALAYSIA

- ZUMT 62087 (1, 254.9 mm; Sarawak State; tagged as “P. 4357”)
ZUMT 62088 (1, 234.2 mm; Sarawak State; tagged as “P. 4356”)
ZUMT 62089 (1, 217.1 mm; Sarawak State; tagged as “P. 4355”)
ZUMT 62090 (1, 180.0 mm; Sarawak State; tagged as “P. 1964”).

Coilia mystus (Linnaeus, 1758)

CHINA

- ZUMT 19092 (1, 153.6 mm), ZUMT 19093 (1, 157.1 mm), ZUMT 19094 (1, 161.4 mm),
ZUMT 19095 (1, 150.4 mm; Shanghai)
ZUMT33308 (1, 116.8 mm SL; China)
ZUMT 43428 (1, 189.6 mm; Wenzhou City, Zhejiang Province)
ZUMT 54559 [1, 285.1 mm; Yellow Sea, east of Yanchong City, Jiangsu Province (34°15'N,
122°15'E), 25 m depth; 12 Oct. 1984; coll. by S. Tanabe]
ZUMT 56185 (1, 115.3 mm), ZUMT 56186 (1, 115.3 mm; estuary of Yangtze River,
Shanghai; 2 Feb. 1904)

YELLOW SEA

- ZUMT 54536 [1 (cleared and stained), 295.8 mm; Yellow Sea (34°05'N, 122°33'E), 25 m
depth; 13 Oct. 1984; coll. by RV *8th Ten-yo-maru*]
ZUMT 54558 [1 (cleared and stained), 237.3 mm; Yellow Sea (34°15'N, 122°15'E), 25 m
depth; 12 Oct. 1984; coll. by RV *8th Ten-yo-maru*]

EAST CHINA SEA

- ZUMT 50588 (1, 289.0 mm; East China Sea; 1957; coll. by Y. Tominaga)
ZUMT 51080 (1, 270.9 mm; East China Sea; 15 Feb. 1960)
ZUMT 51532 (1, 322.6 mm; East China Sea; 30 Mar. 1960)
ZUMT 51888 (1, 254.5 mm), ZUMT 52003 (1, 318.7 mm), ZUMT 52004 (1, 323.2 mm;
East China Sea)

Coilia nasus Temminck & Schlegel, 1846 エツ

JAPAN

- ZUMT 13594 (1, 246.9 mm), ZUMT 13595 (1, 217.0 mm), ZUMT 13596 [1, 234.4 mm; probably
collected from Ariake Sea; donated by O. Kinoshita (Yanagawa Middle High Schools for Girls)]
ZUMT 18059 (1, 223.1 mm SL), ZUMT 18060 (1, 317.0 mm; Ariake Sea)
ZUMT 32612 (1, 170.2 mm SL), ZUMT 32613 (1, 162.3 mm; precise locality unknown,
probably Japan)

ZUMT 35200 (1, 144.2 mm), ZUMT 35202 (1, 143.9 mm), ZUMT 35203 (1, 140.6 mm), ZUMT 35204 (1, 179.2 mm), ZUMT 35205 (1, 184.2 mm), ZUMT 35206 (1, 151.3 mm), ZUMT 35207 (1, 156.8 mm), ZUMT 35208 (1, 146.9 mm), ZUMT 35209 (1, 159.8 mm), ZUMT 35210 (1, 197.8 mm), ZUMT 35211 (1, 149.8 mm), ZUMT 35212 (149.8 mm), ZUMT 35213 (1, 137.1 mm), ZUMT 35214 (1, 145.4 mm), ZUMT 35215 (1, 156.6 mm), ZUMT 35216 (1, 137.3 mm), ZUMT 35217 (1, 136.1 mm), ZUMT 35218 (1, 130.4 mm), ZUMT 35219 (1, 114.1 mm, mouth of Okinohata River, Ariake Sea, Okinohata, Yanagawa City, Fukuoka Pref.; 28 May 1931; coll. by I. Tomiyama)
ZUMT 35685 (1, 235.6 mm), ZUMT 35686 (1, 131.6 mm), ZUMT 35736–35739 (4, 71.7–95.6 mm), ZUMT 36018 (1, 222.8 mm; Ariake Sea; Oct. 1931; coll. by I. Tomiyama)
ZUMT 45970 (17, 168.9–302.7 mm), ZUMT 45971 (12, 155.6–261.1 mm), ZUMT 46011 (27, 21.5–51.3 mm, Yanagawa City, Fukuoka Pref.)
ZUMT 50577 (1, 303.2 mm), ZUMT 50578 (1, 289.3 mm; purchased at Okinohata Fish Market, Yanagawa City, Fukuoka Pref.; 10 Aug. 1959; coll. by Y. Tominaga)
ZUMT 50724 (3, 67.6–71.1 mm; purchased at Okinohata Fish Market, Yanagawa City, Fukuoka Pref.; 10 Apr. 1959; coll. by Y. Tominaga)
ZUMT 57386 (20, 15.6–53.5 mm; Kanegae Bridge, Chikugo River, Kanegae, Okawa City, Fukuoka Pref.; 23 Sept. 1998; coll. by H. Senou and T. Saruwatari)

LOCALITY UNKNOWN

ZUMT 8431 (1, 304.2 mm; no data)

***Coilia rebentischii* Bleeker, 1858**

MALAYSIA

ZUMT 62091 (1, 134.1 mm), ZUMT 62092 (1, 139.1 mm; Sarawak State)

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

TAWIAN

ZUMT 23580 (1, 48.6 mm; Keeleung; July 1929; coll. by S. Arakawa)

PHILIPPINES

ZUMT 47000 (1, 60.9 mm), ZUMT 47001 (1, 59.7 mm; Philippines; 1926; coll. by U. Yamamura; originally included in ZUMT 42031)

Remarks. See Hata and Motomura (2017) regarding the nomenclature of this species.

Encrasicholina pseudoheteroloba (Hardenberg, 1933) ミズスルル

PHILIPPINES

ZUMT 42237 (1, 61.6 mm; Philippines; 1926; coll. by U. Yamamura)

ZUMT 62011 (4, 55.5–70.9 mm; Basilan; 1926; coll. by U. Yamamura)

PALAU

ZUMT ABE 5964 (1, 45.6 mm; Palau)

ZUMT 62019 (33, 30.0–71.4 mm; Palau; Jan. 1938; coll. by Y. Haneda)

ZUMT 62021 (1, 43.5 mm; Palau; stored in same bottle with ZUMT ABE 5963 and 5964)

ZUMT 63058 (1, 34.2 mm; Palau; coll. by Y. Haneda)

ZUMT 31742 [1, 66.2 mm; probably Palau; labelled as 「南洋」 (“nan-yo”, general term for Micronesian Islands)]

NEW GUINEA ISLAND

ZUMT 63156 (1, 49.6 mm; New Guinea Island; coll. by T. Abe)

Remarks. See Hata and Motomura (2017) regarding the nomenclature of this species.

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

TAIWAN

ZUMT 12853 (1, 62.9 mm; Keelung; coll. by T. Aoki)

ZUMT 14846 (1, 75.6 mm; Taiwan; coll. by T. Aoki)

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

JAPAN

HOKKAIDO ZUMT 8265 (5, 60.0–67.7 mm; Otaru Port, Otaru City; 13 Oct. 1911; coll. by Hokkaido Prefectural Fisheries Experimental Station)

ZUMT 11320 (1, 132.5 mm), ZUMT 11321 (1, 130.8 mm), ZUMT 11322 (1, 131.4 mm; off Shiraoi Town; July 1917; coll. by M. Tsuda)

ZUMT 15606 (1, 129.0 mm), ZUMT 15607 (1, 119.1 mm), ZUMT 15608 (140.1 mm), ZUMT 15609 (1, 132.8 mm), ZUMT 15610 (1, 128.4 mm; Muroran; 15 June 1925; coll. by S. Katsuki)

AOMORI PREF. ZUMT 9768 (1, 85.2 mm), ZUMT 9769 (1, 75.9 mm; Jusan-ko Lake, Goshogawara City; 29 Oct. 1919; coll. by S. Kyodo)

ZUMT 12918 (1, 52.2 mm), ZUMT 12919 (1, 104.1 mm), ZUMT 12920 (1, 104.3 mm), ZUMT 12921 (1, 55.4 mm), ZUMT 12922 (1, 49.8 mm), ZUMT 12923 (1, 50.8 mm), ZUMT 12924 (1, 54.1 mm), ZUMT 12925 (1, 105.5 mm), ZUMT 12926 (1, 93.9 mm; Koen-machama, Aomori City; Apr. 1922; coll. by S. Tanabe)

ZUMT 13167 (1, 80.4 mm), ZUMT 13168 (1, 62.4 mm), ZUMT 13169 (1, 105.4 mm),
 ZUMT 13170 (1, 115.6 mm), ZUMT 13171 (1, 82.2 mm), ZUMT 13172 (1, 67.8 mm),
 ZUMT 13173 (1, 85.6 mm; Same, Hachinohe City; coll. by S. Tanabe)
 ZUMT 41711 (1, broken), ZUMT 41736 (1, 110.7 mm), ZUMT 41790 (1, 111.5 mm;
 Asamushi, Aomori City; coll. by S. Tanabe)

IWATE PREF. ZUMT 13889 (1, 114.0 mm; Kesen Region; 28 Dec. 1924; coll. by G. Toba)
 ZUMT 18291 (1, 94.9 mm; Kesen, Rikuzentakata City; 6 Sept. 1928; coll. by G. Toba)

MIYAGI PREF. ZUMT 45620 (1, 62.9 mm), ZUMT 45621 (1, 61.1 mm; Kinkasan Island,
 Ishinomaki City; 3 July 1930)

FUKUSHIMA PREF. ZUMT 32420 (1, 104.3 mm), ZUMT 32421 (1, 85.6 mm), ZUMT
 32422 (1, 70.4 mm), ZUMT 32423 (1, 69.8 mm), ZUMT 32424 (1, 73.8 mm), ZUMT
 32425 (1, 74.0 mm), ZUMT 32426 (1, 68.8 mm), ZUMT 32427 (1, 71.8 mm), ZUMT
 32428 (1, 81.2 mm), ZUMT 32429 (1, 90.9 mm), ZUMT 32430 (1, 68.7 mm), ZUMT
 32431 (1, 69.6 mm), ZUMT 32432 (1, 71.7 mm), ZUMT 32433 (1, 70.9 mm), ZUMT
 32434 (1, 70.6 mm), ZUMT 32435 (1, 72.9 mm), ZUMT 32436 (1, 60.5 mm), ZUMT
 32437 (1, 55.9 mm), ZUMT 32438 (1, 68.6 mm), ZUMT 32439 (1, 61.8 mm; Onahama,
 Iwaki City)

CHIBA PREF. ZUMT 29887 (1, 29.0 mm), ZUMT 29888 [1, 134.4 mm; Kohama, Kazusa-
 ohara (Kohama, Ohara, Isumi City); 22 Jan. 1908; coll. by T. Suzuki]
 ZUMT 33440 (1, 50.0 mm), ZUMT 33441 (1, 45.6 mm; Katsuura City)

TOKYO MARKET ZUMT 21095 (1, 98.4 mm), ZUMT 21096 (1, 107.1 mm; obtained at
 Tokyo Market, Tokyo Met.)

IZU ISLANDS ZUMT 41850 (1, 62.1 mm), ZUMT 42819 (1, 71.9 mm; Hachijo-jima Island)
 ZUMT 63001 (109.3 mm; Motomachi, Izu-oshima Island; 27 July 1991)

KANAGAWA PREF. ZUMT 20814 (1, 73.4 mm), ZUMT 20944 (1, 77.6 mm), ZUMT 34841
 (1, broken), ZUMT 43637 (10, 41.1–79.7 mm; Misaki, Miura City)
 ZUMT 26711 (1, 74.7 mm), ZUMT 26712 (1, 76.6 mm), ZUMT 26713 (1, 81.3 mm),
 ZUMT 26714 (1, 56.3 mm; Aburatsubo, Misaki, Miura City; Oct. 1903)
 ZUMT 34029 (1, broken; Yokohama City or Ninomiya Town)
 ZUMT 33224 (1, 48.6 mm; Kozu, Odawara City; 5 Nov. 1933; coll. by K. Minoshima)
 ZUMT 55636 (1, 86.6 mm; Misaki Fish Market, Miura City; 29 July 1986)

SHIZUOKA PREF. ZUMT 17748 (1, 92.5 mm), ZUMT 17749 (1, 85.0 mm), ZUMT 17750
 (1, 106.4 mm), ZUMT 17751 (1, 107.1 mm), ZUMT 17756 (1, 61.9 mm), ZUMT 17797
 (1, 45.9 mm; Enoura, Numazu City; coll. by N. Kuroda)
 ZUMT 34216 (1, damaged; estuary of Kano-gawa River, Ganyudo, Numazu City)
 ZUMT 55453 (4, 38.2–39.9 mm; tidepool at Shitagaura, Shimoda City; 22 Sept. 1986)

MIE PREF. ZUMT 38342 (1, 72.0 mm), ZUMT 38343 (1, 66.2 mm), ZUMT 38344 (1, 80.0
 mm), ZUMT 38345 (1, 67.4 mm), ZUMT 38346 (1, 73.8 mm), ZUMT 38347 (1, 78.7
 mm), ZUMT 38348 (1, 75.1 mm), ZUMT 38349 (1, 72.7 mm), ZUMT 38350 (1, 70.3
 mm), ZUMT 38351 (1, 65.0 mm; Hamajima, Shima City; Sept. 1920)

WAKAYAMA PREF. ZUMT 9919 (1, 104.1 mm; near Wakayama City; coll. by S. Sakaguchi)
 ZUMT 21729 (1, 92.3 mm; Wakayama Pref.; Oct. 1904)
 ZUMT 44842 (1, 47.9 mm; Yuasa Bay Yuasa Town; Mar. 1919)

YAMAGATA PREF. ZUMT 62046 (3, 113.6–129.0 mm; Sakata City; 17 July 1933)

NIIGATA PREF. ZUMT 33476 (1, damaged; Shibata City)

TOYAMA PREF. ZUMT 32686 (1, 41.2 mm; Toyama Bay)

ZUMT 44174 (1, 88.3 mm; probably Toyama Pref.; donation from Toyama Prefectural Fisheries Training Center)

ZUMT 46272 (1, 113.6 mm), ZUMT 46273 (1, 125.1 mm; Uozu or Namerikawa City)

KYOTO PREF. ZUMT 24375 (1, 95.0 mm), ZUMT 24376 (1, 98.5 mm; Miyazu City; Nov. 1931; coll. by Kyoto Prefectural Fisheries Training Center)

ZUMT 62016 (7, 50.4–69.5 mm; obtained at Maizuru Fish Market, Maizuru City; 3 Nov. 1986)

SHIMANE PREF. ZUMT 31314 (1, 97.1 mm; Matsue City)

YAMAGUCHI PREF. ZUMT 33642 (1, 99.4 mm), ZUMT 33643 [1, 94.5 mm; probably collected from Seto Inland Sea (Yamaguchi Pref.); donated by M. Eitomi (San-yo-onoda City)]

KOCHI PREF. ZUMT 18660 (41, 19.3–35.5 mm; Susaki City; 26 Dec. 1924; coll. by T. Kamohara)]

FUKUOKA PREF. ZUMT 62069 (20, 26.6–33.7 mm; Yanagawa City; 30 Mar. 1931; coll. by I. Tomiyama)

SAGA PREF. ZUMT 57346 (4, 61.8–74.7 mm), ZUMT 57347 (1, 85.1 mm; Kashima Fish Market, Kashima City; 22 Sept. 1987; coll. by H. Senou and T. Saruwatari)

ZUMT 57357 (1, 86.9 mm; Nanaura, Kashima City; 23 Sept. 1987; coll. by H. Senou and T. Saruwatari)

NAGASAKI PREF. ZUMT 2722 (2, 32.8 mm, other specimen damaged; Nagasaki Pref.; Mar. 1910)

ZUMT 43484 (2, 57.0–59.0 mm; Nagasaki Pref.)

ZUMT 48196 [1, 103.5 mm; Tamanoura, Goto City (Fukue-jima Island, Goto Islands); 23 May 1953; coll. by I. Tomiyama]

ZUMT 50021 [1, 103.8 mm; Tamanoura, Goto City (Fukue-jima Island, Goto Islands); 12 Oct. 1953; coll. by I. Tomiyama]

ARIAKE SEA ZUMT 13909 (1, 112.3 mm; Ariake Sea; 14 Dec. 1924; coll. by O. Kinoshita)

ZUMT, 18192 (1, 75.9 mm), ZUMT 18193 (1, 77.5 mm; Ariake Sea; coll. by Fukuoka Prefectural Fisheries Experimental Station)

ZUMT 35687 (1, 38.4 mm), ZUMT 35688 (1, 69.3 mm), ZUMT 35689 (1, 76.5mm), ZUMT 35690 (1, 72.9 mm), ZUMT 35691 (1, 68.0 mm), ZUMT 35692 (1, 69.3 mm), ZUMT 35693 (1, 70.0 mm), ZUMT 35695 (1, 69.1 mm; Ariake Sea; Oct. 1931; coll. by I. Tomiyama)

OITA PREF. ZUMT 1589 (2, damaged; Beppu City; 12 Mar. 1899; coll. by T. Terasaki)

KAGOSHIMA PREF. ZUMT 24087 (1, 81.9 mm), ZUMT 24138 (1, 131.8 mm), ZUMT 24139 (1, 133.3 mm; Taniyama, Kagoshima City)

CHINA

ZUMT 54437 [5, 101.3–114.3 mm; Yellow Sea, east of Lianyungang City, Jiangsu Province (34°47'N, 122°20'E), 25 m depth; 15 Oct. 1984; coll. by RV *8th Ten-yo-maru*]

TAIWAN

ZUMT 12844 (1, 80.9 mm), ZUMT 12845 (1, 79.0 mm), ZUMT 12846 (1, 64.2 mm),
ZUMT 12854 (1, 79.0 mm), ZUMT 12855 (1, 55.7 mm), ZUMT 12856 (1, 61.8 mm),
ZUMT 12857 (1, 56.2 mm), ZUMT 12858 (1, 52.1 mm; Keelung; coll. by T. Aoki)
ZUMT 13680 (1, 74.6 mm), ZUMT 13681 [1, 64.3 mm; Taiwan; coll. by T. Aoki
(Government-General of Taiwan)]
ZUMT 14836 (1, 82.4 mm), ZUMT 14837 (1, 84.4 mm), ZUMT 14838 (1, 84.0 mm),
ZUMT 14839 (1, 75.8 mm), ZUMT 14840 (1, 84.4mm), ZUMT 14841 (1, 79.6 mm),
ZUMT 14842 (1, 77.7 mm), ZUMT 14843 (1, 77.4 mm), ZUMT 14844 (1, 79.8 mm),
ZUMT 14845 (1, 76.5 mm; Taiwan; coll. by T. Aoki)
ZUMT 63274 (1, 75.1 mm), ZUMT 63275 (1, 78.8 mm; Tamsui, Xinbei City)

LOCALITY UNKNOWN

ZUMT ABE 6108 (4, 42.1–64.9 mm), ZUMT ABE 61-877 (1, 121.0 mm), ZUMT ABE 83-
592 (1, 97.2 mm), ZUMT 45640 (1, 61.2 mm), ZUMT 62110 (4, 91.3–98.9 mm; no data)

Engraulis mordax Girard, 1854

USA

ZUMT 17658 (1, 105.7 mm; California State)

Setipinna tenuifilis (Valenciennes, 1848) ツマリエツ

KOREA

ZUMT 1591 (1, 126.7 mm; Incheon)
ZUMT 12876 (1, 117.2 mm; Kunsan, North Jeolla Province)

CHINA

ZUMT 54566 [4 (1 specimen cleared and stained), 112.9–143.9 mm; East China Sea,
northeast of Shanghai (32°15'N, 122°40'E), 25 m depth; 11 Oct. 1984; coll. by RV *8th*
Ten-yo-maru]

EAST CHINA SEA

ZUMT 51266 [1, 127.7 mm; East China Sea (landed at Fukuoka Fish Market, Japan); 24
Dec. 1959; coll. by Y. Tominaga]
ZUMT 51312 (1, 163.3 mm), ZUMT 51313 (1, 159.8 mm; East China Sea; coll. by Y.
Tominaga)
ZUMT 51741 (1, 156.3 mm), ZUMT 51742 (1, 180.4 mm), ZUMT 51831 (1, 154.8 mm),
ZUMT 51832 (1, 156.5 mm; East China Sea; coll. by RV *Ten-yo-maru*)

LOCALITY UNKNOWN

ZUMT 49828 (1, 140.9 mm; obtained at Fukuoka Fish Market; 28 July 1959)

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

JAPAN

ZUMT 58411 (1, 29.2 mm; estuary of Yonada River, Iriomote-jima Island, Yaeyama Islands, Ryukyu Archipelago; 13 July 1988; coll. by H. Senou and M. Aizawa)

TAIWAN

ZUMT 5789 (1, 88.5 mm; Su'ao; Sept. 1896; coll. by K. Tada)

ZUMT 18453 (1, 83.4 mm; Keelung; Sept. 1927; coll. H. Sato)

PHILIPPINES

ZUMT 40810 (1, 86.6 mm), ZUMT 40848 (1, 86.6 mm), ZUMT 40858 (1, 93.0 mm; Manila, Luzon; 11 Feb. 1909; coll. by I. Iijima and K. Aoki)

ZUMT 47062 (1, 75.7 mm; Philippines; 1926; coll. by U. Yamamura)

ZUMT 62015 (3, 43.6–56.4 mm; Jolo Island; Feb. 1909; coll. by I. Iijima and K. Aoki)

PALAU

ZUMT ABE 3045 (3, 82.6–95.7 mm; Palau)

ZUMT 62053 (3, 72.1–76.4 mm; Palau; stored in same bottle with ZUMT ABE 5963 and 5964)

Remarks. See Hata et al. (2021b) regarding the nomenclature of this species.

***Stolephorus bataviensis* Hardenberg, 1933**

PHILIPPINES

ZUMT 39510 (1, 58.2 mm), ZUMT 39511 (1, 63.9 mm), ZUMT 39513 (1, 59.1 mm), ZUMT 39514 (1, 60.1 mm), ZUMT 39515 (1, 62.1 mm), ZUMT 39516 (1, 61.1 mm; Philippines; coll. by U. Yamamura)

ZUMT 62012 (1, 58.4 mm; Jolo Island; Feb. 1909; coll. by I. Iijima and K. Aoki)

PAPUA NEW GUINEA

ZUMT 62114 [1 (cleared and stained), 81.7 mm; Port Moresby; 22 Jan. 1970]

Remarks. See Hata et al. (2019) regarding the nomenclature of this species.

Stolephorus baweanensis Hardenberg, 1933

SINGAPORE

ZUMT 62068 (32, 47.4–63.1 mm; Singapore; 23 Feb. 1922; coll. by D. Stead)

Remarks. See Hata et al. (2019) regarding the nomenclature of this species.

Stolephorus belaeirus Hata, Lavoué & Motomura, 2021

TANZANIA

ZUMT 52870 (1, 123.6 mm; Kunduchi, Dal es Salaam)

Remarks. See Hata et al. (2021b) regarding the nomenclature of this species.

Stolephorus bengalensis (Dutt & Babu Rao, 1959)

CHINA

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

SINGAPORE

ZUMT 62056 (5, 28.5–38.4 mm; Singapore; 23 Feb. 1922; coll. by D. G. Stead; although the lot originally included 9 specimens, two each specimens were spared for 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. See Hata et al. (2019) regarding the nomenclature of this species.

Stolephorus mercurius Hata, Lavoué & Motomura, 2021 ヤエヤマアイノコイワシ

TAIWAN

ZUMT 12839 (1, 77.3 mm), ZUMT 12840 (1, 75.0 mm; Keelung; coll. by T. Aoki)

ZUMT 13666 (1, 76.9 mm; Taiwan; coll. by T. Aoki)

ZUMT 19049 (1, 83.1 mm), ZUMT 19688 (1, 72.1 mm; Taiwan; coll. by H. Sato)

PALAU

ZUMT 62051 (5, 78.0–92.8 mm; Palau; stored in same bottle with ZUMT ABE 5963 and 5964)

Remarks. See Hata et al. (2021a) regarding the nomenclature of this species.

Stolephorus rex Jordan & Seale, 1926

PHILIPPINES

ZUMT 39512 (1, 63.2 mm; Philippines; coll. by U. Yamamura)

ZUMT 41002 (1, 54.7 mm; Jolo Island; Feb. 1909; coll. by I. Iijima and K. Aoki), ZUMT 47002 (1, 60.8 mm; Philippines; 1926; coll. by U. Yamamura)

INDONESIA

ZUMT 42126 (1, 92.3 mm), ZUMT 42127 (1, 94.3 mm; Jakarta, Java); 5 Mar. 1909; coll. by I. Iijima and K. Aoki)

PALAU

ZUMT 62052 (3, 79.4–82.4 mm; Palau; stored in same bottle with ZUMT ABE 5963 and 5964)

Remarks. See Hata et al. (2021a) regarding the nomenclature of this species.

Stolephorus teguhi Kimura, Hori & Shibukawa 2009

(Fig. 1B)

PHILIPPINES

ZUMT 62055 (1, 67.2 mm; Jolo Island; Feb. 1909; coll. by I. Iijima and K. Aoki; originally included in ZUMT 40900)

Remarks. Because only a single specimen of *S. teguhi* (collected in Pagapas Bay, Luzon) has been recorded previously from the Philippines (Hata and Motomura, 2017, 2021b), this specimen represents the second record of the species from that region.

Thrissina baelama (Fabricius, 1775) オオイワシ

JAPAN

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

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

PHILIPPINES

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)

PALAU

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. Nomenclature and authorship of the genus *Thrissina*, and authorship of the nominal species follow Kottelat (2013) and Fricke (2008), respectively.

Hata and Koeda (2021) reported ZUMT 39727, a specimen collected from Okinawa-jima Island, as the first specimen-based record of the species from the island.

Thrissina chefuensis (Günther, 1874) タイリクカタクチ

LOCALITY UNKNOWN

ZUMT 62009 (3, 86.8–91.5 mm; no data)

Thrissina dussumieri (Valenciennes, 1848) ツルギカタクチ

TAIWAN

ZUMT 14888 (1, 76.9 mm), ZUMT 14889, (1, 79.2 mm), ZUMT 14890 (1, 79.2 mm),
ZUMT 14891 (1, 78.3 mm; Taiwan; coll. by T. Aoki)
ZUMT 63269 (7, 30.2–42.3 mm; obtained at Tamsui Market, Tamsui, Xinbei City; 19 Oct. 1930)

PHILIPPINES

ZUMT 39508 (1, 82.4 mm), ZUMT 39509 (1, 79.3 mm; Philippines; coll. by U. Yamamura)

INDONESIA

ZUMT 42124 (1, 94.5 mm), ZUMT 42125 (1, 86.4 mm), ZUMT 62606 (1, 90.5 mm;
Jakarta, Java; 5 Mar. 1909; coll. by I. Iijima and K. Aoki)

SINGAPORE

ZUMT 62105 (12, 22.4–25.3 mm; Singapore; 23 Feb. 1922; coll. by D. Stead; separated
from ZUMT 10494)
ZUMT 62427 (1, 102.0 mm; Singapore)

LOCALITY UNKNOWN

ZUMT 62428 (1, 99.9 mm; no data)

Thrissina katana Hata, Lavoué & Motomura, 2022 チョウセンタレクチ

TAIWAN

ZUMT 13682 (1, 77.9 mm), ZUMT 13683 (1, 67.2 mm), ZUMT 13684 (68.6 mm; Dong-
gang; coll. by T. Aoki)
ZUMT 14968 (paratype of *Thrissina katana*, 1, 187.6 mm; Tainan; coll. by T. Aoki)
ZUMT 23560 (1, 55.9 mm; Taiwan; coll. by S. Arakawa)

SINGAPORE

ZUMT 62104 (13, 23.3–24.9 mm; Singapore; 23 Feb. 1922; coll. by D. Stead; separated from ZUMT 10494)

Remarks. See Hata et al. (2022; ZUMT 14968 designated as a paratype of *T. katana*) regarding the nomenclature of this species.

Thrissina setirostris (Broussonet, 1782)

TAIWAN

ZUMT 63317 (2, 30.2–42.3 mm; obtained Tamsui Market, Tamsui, Xinbei City; 19 Oct. 1930)

PHILIPPINES

ZUMT 42058 (1, 52.2 mm), ZUMT 42059 (1, 50.1 mm), ZUMT 42060 (1, 53.9 mm),
ZUMT 42190 (1, 53.7 mm; Philippines; 1926; coll. by U. Yamamura)
ZUMT 62017 (3, 48.2–61.9 mm; Basilan; 1926; coll. by U. Yamamura)

Thrissina vitirostris (Gilchrist & Thompson, 1908)

ZUMT 53042 (1, 103.5 mm), ZUMT 53043 (1, 76.9 mm; probably collected from African coast)

Remarks. Identification of these specimens followed Hata and Motomura (2019c).

Thrissina sp.

(Fig. 1C)

KOREA

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

Remarks. Although the specimen resembles *Thrissina mystax* (Bloch & Schneider, 1801) (distributed off coastal India to Indonesia) in having a long maxilla, posteriorly reaching to the pectoral-fin base, and 37 branched anal-fin rays, it has higher count of lower gill rakers on the first gill arch than *T. mystax* (18 vs. 14–16 in *T. mystax*; Whitehead et al., 1988; Wongratana et al., 1999).

Clupeidae ニシン科
***Alosa alosa* (Linnaeus, 1758)**

LOCALITY UNKNOWN

ZUMT 62050 [1, 422.0 mm; no data (tagged as “EC037”)]

***Amblygaster clupeioides* Bleeker, 1849**

PALAU

ZUMT ABE 3799 (1, 78.1 mm; Palau)

***Amblygaster leiogaster* (Valenciennes, 1847) ヤマトミズン**

JAPAN

ZUMT 13729 [1, 140.0 mm; probably Okinawa Pref.; donated by C. Gusukuma (Okinawa Women's Higher Normal School)]

ZUMT 17079 (1, 75.9 mm; Itoman City, Okinawa Pref.; coll. by S. Tanabe)

TAIWAN

ZUMT 13668 [1, 80.9 mm; probably Taiwan; donated by T. Aoki (Fisheries Section, Government-General of Taiwan)]

PHILIPPINES

ZUMT 42139 (1, 189.2 mm; Philippines; 1926; coll. by U. Yamamura)

PALAU

ZUMT ABE 3027 (1, 170.7 mm), ZUMT ABE 3028 (1, 175.0 mm), ZUMT ABE 3806 (5, 42.0–51.1 mm; Palau)

***Amblygaster sirm* (Walbaum, 1792) ホシヤマトミズン**

JAPAN

ZUMT 14482 (1, 183.5 mm), ZUMT 14483 (1, 183.2 mm; Okinawa Pref.; coll. by S. Sakaguchi)

ZUMT 15268 (1, 191.2 mm), ZUMT 15291 (1, 193.6 mm), ZUMT 15292 [1, 195.2 mm; probably Okinawa-jima Island, Ryukyu Archipelago; coll. by S. Sakaguchi (Okinawa Prefectural Daiichi Junior High School)]

ZUMT 18221 (1, 193.0 mm), ZUMT 18222 (1, 205.3 mm), ZUMT 18224 (1, 199.5 mm; Okinawa Pref.; coll. by Okinawa Prefectural Fisheries Experimental Station)

PHILIPPINES

ZUMT 12688 (1, 141.6 mm; Philippines; coll. by U. Yamamura)
ZUMT 62010 (1, 196.3 mm; Philippines; 1926; coll. by U. Yamamura)

PALAU

ZUMT ABE 3801, (1, 168.4 mm), ZUMT ABE 3802 (1, 171.2 mm), ZUMT ABE 3803 (1, 174.1 mm), ZUMT ABE 6012–6015 (4, 171.9–197.8 mm; Palau)

LOCALITY UNKNOWN

ZUMT ABE 58-172 (1, 128.4 mm; no data)

Anodontostoma chacunda (Hamilton, 1822)

PHILIPPINES

ZUMT 40859 (1, 102.0 mm; Manila, Luzon; 11 Feb. 1909; coll. by I. Iijima and K. Aoki)
ZUMT 42140 (1, 130.0 mm), ZUMT 42141 (1, 115.6 mm), ZUMT 42165 (1, 117.0 mm),
ZUMT 42238 (1, 117.4 mm), ZUMT 42255 (1, 120.9 mm; Philippines; 1926; coll. by U. Yamamura)

Clupanodon thrissa (Linnaeus, 1758)

TAIWAN

ZUMT 45280 (1, 54.9 mm), ZUMT 45437 (1, 105.5 mm; Taiwan)
ZUMT 62074 (3, 143.3–187.8 mm; purchased at Chitosecho Market, Taipei City; 4 Feb. 1931)

Clupea harengus Linnaeus, 1758

UK

ZUMT 12277 (1, 214.4 mm; probably from British waters; donation from British Museum)

Clupea pallasii Valenciennes, 1847 ニシン

BERING SEA

ZUMT 47849 (1, 293.8 mm), ZUMT 47850 (1, 299.2 mm), ZUMT 47851 (1, 206.4 mm),
ZUMT 47852 (1, 179.5 mm; Bering Sea; 31 July 1938)

USA

ZUMT 17656 (1, 173.4 mm), ZUMT 17657 (1, 134.8 mm; California State)

RUSSIA

ZUMT 10313 (15, 132.5–175.1 mm), ZUMT 10316 (14, 100.9–125.5 mm; probably collected from Sakhalin, donation from Sakhalin Chamber of Commerce)
ZUMT 19736 (1, 103.3 mm), ZUMT 19737 (1, 103.5 mm), ZUMT 19738 (1, 150.4 mm), ZUMT 19739 (1, 107.1 mm; Ozero Nevskoye, Sakhalin; Oct. 1927; coll. by K. Sakamoto)
ZUMT 21044 (1, 93.1 mm), ZUMT 21045 (1, 84.1 mm), ZUMT 21046 (1, 94.2 mm), ZUMT 21047 (1, 90.3 mm), ZUMT 21048 (1, 91.7 mm), ZUMT 21049 (1, 86.8 mm), ZUMT 21050 (1, 82.4 mm; probably collected from Sakhalin, donation from Sakhalin Chamber of Commerce; Sept. 1921)
ZUMT 36748 (1, 68.7 mm), ZUMT 36749 [1, 66.5 mm; Rakuma, Randomari Village, Karafuto (currently Yablochnoye Village, Kholms District, Sakhalin)]
ZUMT 38322 (1, 145.2 mm), ZUMT 38323 (1, 142.2 mm), ZUMT 38324 (1, 153.0 mm), ZUMT 38325 (1, 144.9 mm), ZUMT 38326 (1, 122.0 mm), ZUMT 38327 (1, 145.3 mm; no data), ZUMT 38328 (6, 58.2–144.2 mm), ZUMT 41565 (1, 83.4 mm), ZUMT 41566 (1, 85.9 mm), ZUMT 41594 (1, 91.8 mm), ZUMT 41597 (1, 104.0 mm; Sakhalin), ZUMT 44148 (1, 255.1 mm; Primorskaya Oblast)

JAPAN

HOKKAIDO ZUMT 10754 (1, 142.6 mm), ZUMT 10755 (1, 96.9 mm), ZUMT 10756 (1, 132.1 mm), ZUMT 10757 (1, 122.2 mm), ZUMT 10758 (1, 130.1 mm), ZUMT 10759 (1, 143.4 mm), ZUMT 10760 (1, 117.4 mm), ZUMT 10761 (1, 130.7 mm), ZUMT 10762 (1, 91.4 mm), ZUMT 10763 (1, 114.2 mm), ZUMT 10766 (1, 74.0 mm), ZUMT 10767 (1, 130.6 mm), ZUMT 10774 (1, 221.1 mm), ZUMT 10775 (1, 136.1 mm), ZUMT 10784 (1, 105.0 mm), ZUMT 10791 (1, 99.4 mm; Kushiro City; Nov. 1922; coll. by M. Akiya)
ZUMT 11552 (1, 83.0 mm; probably collected from Nemuro City; donation from Nemuro Branch Station, Hokkaido Fisheries Research Institute)
ZUMT 25453 (31, 85.8–106.2 mm; Mori Town; 8 Feb. 1910)
ZUMT 40581 (1, 134.0 mm), ZUMT 40582 (1, 127.7 mm), ZUMT 40583 (1, 140.4 mm), ZUMT 40584 (1, 146.2 mm), ZUMT 40585 (1, 142.0 mm), ZUMT 40606 (1, 197.6 mm), ZUMT 40607 [1, 210.8 mm; Hokkaido (Abashiri, Sapporo, or Hakodate)]
AOMORI PREF. ZUMT 13225 (1, 189.8 mm; Hamasuka, Minato, Hachinohe City; 26 Oct. 1923; coll. by S. Tanabe)
ZUMT 44383 (1, 150.2 mm), ZUMT 44384 (1, 136.9 mm), ZUMT 44385 (1, 141.9 mm), ZUMT 44386 (1, 163.8 mm), ZUMT 44387 (1, 144.5 mm), ZUMT 44388 (1, 143.8 mm), ZUMT 44389 (1, 120.0 mm), ZUMT 44390 (1, 132.4 mm), ZUMT 44391 (1, 144.4 mm), ZUMT 44392 (1, 132.0 mm), ZUMT 44393 (1, 132.6 mm), ZUMT 44394 (1, 129.6 mm), ZUMT 44395 [1, 119.9 mm; probably collected from Aomori Pref.; donated by H. Murai (Aomori Prefectural Fisheries Experimental Station)]
IWATE PREF. ZUMT 13070 (1, 184.4 mm; Miyako Bay; coll. by S. Tanabe)
MIYAGI PREF. ZUMT 13587 (1, 110.9 mm; Matsushima; 18 May, 1897; coll. G. Toba)
FUKUSHIMA PREF. ZUMT 37673 (1, 141.4 mm; Onahama, Iwaki City)
IBARAKI PREF. ZUMT 17868 (1, 194.3 mm), ZUMT 17869 (1, 207.1 mm; Hinuma Lake)

TOYAMA PREF. ZUMT 17813 (1, 56.1 mm), ZUMT 17814 [1, 54.1 mm; probably Toyama Bay; donated by U. Ichijima (Toyama Prefectural Fisheries Training Center)]
ZUMT 17817 (1, 53.8 mm; Namerikawa City; 12 Sept. 1927; coll. by U. Ichijima)
ZUMT 44149 (1, 231.0 mm; probably Toyama Pref.; donation from Toyama Prefectural Fisheries Training Center)

KOREA

ZUMT 54230 (1, 193.2 mm), ZUMT 54231 (1, 183.0 mm), ZUMT 54232 (1, 203.2 mm),
ZUMT 54233 (1, 178.3 mm), ZUMT 54234 (1, 188.0 mm), ZUMT 54235 (1, 191.8 mm),
ZUMT 54236 [1, 192.2 mm; Yellow Sea, west of Gunsan (35°45'N, 124°45'E)]

LOCALITY UNKNOWN

ZUMT 8657 (1, 226.8 mm), ZUMT 57260 (2, 147.2–188.3 mm), ZUMT 62076 (1, 137.3 mm),
ZUMT ABE 6218 (1, 87.0 mm), ZUMT ABE 6219 (1, 86.3 mm), ZUMT ABE 6220 (1, 54.7 mm),
ZUMT ABE 9895 (6, 62.0–79.0 mm), ZUMT ABE 9898 (1, 128.5 mm), ZUMT ABE 9899 (1, 133.0 mm; no data)
ZUMT 34081 (1, 126.3 mm), ZUMT 34083 [1, 132.9 mm; locality unknown; donated by H. Kakuda (Onahama, Iwaki City, Fukushima Pref., Japan)]

***Herklotsichthys quadrimaculatus* (Rüppell, 1837) ミズン**

JAPAN

ZUMT 16761 (1, 82.8 mm; Onna Village, Okinawa Pref.; S. Tanabe)

TAIWAN

ZUMT 12842 (1, 79.3 mm; Keelung; coll. by T. Aoki)
ZUMT 62029 (1, 93.6 mm), ZUMT 62030 (1, 109.0 mm), ZUMT 62032 (1, 96.8 mm SL;
purchased at fish market in Ximending, Taipei City; 14 Feb. 1931)
ZUMT 62031 (1, 97.5 mm SL; purchased at fish market in Ximending, Taipei City; 10 May 1929)

PHILIPPINES

ZUMT 40921 (1, 61.5 mm), ZUMT 40949 (1, 58.2 mm), ZUMT 40957 (1, 63.9 mm; Jolo Island; Feb. 1909; coll. by I. Ichijima and K. Aoki)
ZUMT 42106 (1, 56.3 mm; Philippines; 1926; coll. by U. Yamamura)

PALAU

ZUMT ABE 2721 (1, 78.7 mm), ZUMT ABE 2722 (1, 82.9 mm), ZUMT ABE 2723 (1, 74.1 mm),
ZUMT ABE 2724 (1, 83.3 mm), ZUMT ABE 2725 (1, 77.5 mm), ZUMT ABE 2726 (1, 81.1 mm),
ZUMT ABE 2727 (1, 87.9 mm), ZUMT ABE 2728 (1, 81.7 mm), ZUMT ABE 2800 (1, 81.9 mm),
ZUMT ABE 2801 (1, 81.8 mm), ZUMT ABE 2899 (1, 85.3 mm), ZUMT ABE 2900 (1, 80.5 mm),
ZUMT ABE 2901 (1, 80.5 mm), ZUMT ABE

2902 (1, 90.8 mm), ZUMT ABE 3030 (1, 101.0 mm), ZUMT ABE 3031 (1, 95.4 mm), ZUMT ABE 3032 (1, 78.4 mm), ZUMT ABE 3033 (1, 95.2 mm), ZUMT ABE 3034 (1, 100.2 mm), ZUMT ABE 3800 (1, 102.2 mm; Palau)
ZUMT 55295 (1, 74.0 mm; Palau; Aug. 1935; coll. by Y. Haneda)
ZUMT 62045 (2, 67.9–72.9 mm; Palau; coll. by Y. Haneda)
ZUMT 62063 (38, 55.8–91.0 mm; Palau; stored in same bottle with ZUMT ABE 5963 and 5964)
ZUMT 38298 [28, 75.8–97.8 mm; probably Palau; labelled as 「南洋」 (“nan-yo”, general term for Micronesian Islands)

INDONESIA

ZUMT 62008 (2, 90.6–93.3 mm; Manado, Sulawesi; Mar. 1918; coll. by K. Aoki)

Herklotsichthys koningsbergeri (Weber & de Beaufort, 1912)

LOCALITY UNKNOWN

ZUMT ABE 11054 (1, 113.9 mm; no data)

Herklotsichthys sp.

(Fig. 1D)

LOCALITY UNKNOWN

ZUMT ABE 11051 (1, 120.1 mm), ZUMT ABE 11052 (1, 114.3 mm), ZUMT AB 11053 (1, 118.4 mm), ZUMT ABE 11056 (1, 110.7 mm), ZUMT ABE 11058 (1, 115.8 mm), ZUMT ABE 11059 (1, 112.7 mm), ZUMT ABE 11060 (1, 125.6 mm), ZUMT ABE 11061 (1, 110.4 mm; no data)

Remarks. Although these specimens resembled *H. quadrimaculatus* in having elongated wing-like scales on the dorsum anterior to the dorsal fin, a similar number of gill rakers, and lack distinct black spots on the body surface, the former differed in having a distinctively deeper body (greater than 31.8% of standard length vs. less than 30% in *H. quadrimaculatus*; Whitehead 1985; Munroe et al. 1999).

Hilsa kelee (Cuvier, 1829)

INDONESIA

ZUMT 42130 (1, 142.4 mm), ZUMT 62605 (1, 148.2 mm; Jakarta, Java; 5 Mar. 1909; coll. by I. Iijima and K. Aoki)

LOCALITY UNKNOWN

ZUMT 53040 (1, 120.3 mm; probably African coast)
ZUMT 55118–55119 (2, 73.7–80.8 mm; no data)

Konosirus punctatus (Temminck & Schlegel, 1846) コノシロ

JAPAN

AOMORI PREF. ZUMT 12935 (1, 74.3 mm), ZUMT 12936 (1, 85.9 mm), ZUMT 12937 (1, 89.7 mm), ZUMT 12938 (1, 89.5 mm), ZUMT 12939 (1, 79.2 mm), ZUMT 12940 (1, 85.5 mm), ZUMT 12941 (1, 84.6 mm), ZUMT 12942 (1, 81.8 mm; Koen-machama, Aomori City; 4 Nov. 1923; coll. by S. Tanabe)

IWATE PREF. ZUMT 13050 (1, 249.1 mm; Miyako Bay; coll. by S. Tanabe)

ZUMT 15400 (1, 151.3 mm; obtained at Morioka Market, Morioka City; 1 May 1925; coll. by G. Toba)

ZUMT 30592 (1, 90.6 mm; Rikuzentakata City; 8 Jan. 1934)

AKITA PREF. ZUMT 49562 (1, 123.0 mm; Hachirogata Lake; 1943; coll. by S. Tanaka)

YAMAGATA PREF. ZUMT 35926 (1, 55.0 mm), ZUMT 35927 (1, 46.1 mm; Sakata City; 16 Aug. 1936)

ZUMT 62080 (1, 142.3 mm; Sakata City; 17 July 1933)

NIIGATA PREF. ZUMT 33483 (1, 95.6 mm; Shibata City)

TOYAMA PREF. ZUMT 8390 (1, 69.1 mm), ZUMT 8391 [1, 85.0 mm; probably collected from Toyama Pref.; donated by Y. Ochi (Toyama Normal School)]

ZUMT 46207 (1, 185.6 mm), ZUMT 46219 (1, 186.1 mm; Uozu or Namerikawa City)

ZUMT 41498 (1, 193.2 mm; Uozu City; June 1932; coll. by I. Tomiyama)

ISHIKAWA PREF. ZUMT 34199 (1, 52.9 mm; Shoin, Suzu City)

CHIBA PREF. ZUMT 33411 (1, 135.9 mm), ZUMT 33412 (1, 150.3 mm; Katsuura City)

KANAGAWA PREF. ZUMT 50512 (1, 201.9 mm; Aburatsubo, Misaki, Miura City; 7 July 1959; coll. by Y. Tominaga)

KYOTO PREF. ZUMT 24323 (1, 208.5 mm; Miyazu City; Nov. 1931; coll. by Kyoto Prefectural Fisheries Training Center)

HYOGO PREF. ZUMT 44664 (1, 44.1 mm; Sumoto City, Awaji-shima Island)

OKAYAMA PREF. ZUMT 16429 (1, 117.0 mm; Kanaura, Kasaoka City; coll. by K. Matsushima)

SHIMANE PREF. ZUMT 31206 (1, 176.4 mm), ZUMT 31248 (1, 114.0 mm; Matsue City)

EHIME PREF. ZUMT 7134 (1, 194.6 mm; pearl farm at Uchiumi, Ainan Town; 28 Oct. 1915; coll. by K. Otsuki)

ZUMT 24962 (1, 174.8 mm; Horie, Matsuyama City; Oct. 1931; coll. by S. Ishikawa)

FUKUOKA PREF. ZUMT 35097 (1, 147.3 mm), ZUMT 35098 (1, 138.0 mm), ZUMT 35099 (1, 150.4 mm; Ariake Sea, off Okinohata, Yanagawa City; 28 May 1931; coll. by I. Tomiyama)

ZUMT 50579 (1, 173.9 mm), ZUMT 50580 (1, 160.4 mm; purchased at Okinohata Fish Market, Yanagawa City; 10 Aug. 1959; coll. by Y. Tominaga)

SAGA PREF. ZUMT 57331 (150.8 mm; Nanaura, Kashima City; 23 Sept. 1987; coll. by H. Senou and T. Saruwatari)

ARIAKE SEA ZUMT 18056 (1, 213.8 mm), ZUMT 18074 (1, 115.0 mm), ZUMT 18075 (1, 124.8 mm), ZUMT 18076 (1, 142.2 mm; Ariake Sea; coll. by Fukuoka Prefectural Fisheries Experimental Station)

OITA PREF. ZUMT 16545 (1, 32.8 mm; Oita City; coll. by Y. Yamamoto)

KAGOSHIMA PREF. ZUMT 23832 (1, 123.4 mm), ZUMT 23957 (1, 104.5 mm; Kagoshima City), ZUMT 23981 (1, 126.8 mm), ZUMT 23982 (1, 123.8 mm; Shibushi City)
ZUMT 26866 (1, 141.6 mm; Kagoshima Pref.)

PRECISE LOCALITY UNKNOWN ZUMT 33251 (1, 123.9 mm), ZUMT 33252 (1, 112.5 mm; Japan)

YELLOW SEA

ZUMT 54538 (1, 181.1 mm), ZUMT 54560 [1, 176.5 mm; Yellow Sea (34°05'N, 122°33'E), 25 m depth; 13 Oct. 1984; coll. by RV *8th Ten-yo-maru*]

ZUMT 62075 (1, 50.3 mm; probably Bohai or Yellow seas; trawl; donation from Fisheries Experimental Station of Kwantung Agency)

EAST CHINA SEA

ZUMT 51165 (1, 136.1 mm; East China Sea; Jan. 1960)

ZUMT 51264 [1, 136.2 mm; East China Sea (obtained at Fukuoka Fish Market), 24 Dec. 1959, Y. Tominaga]

LOCALITY UNKNOWN

ZUMT 17613 (1, 110.9 mm), ZUMT 37562 (1, 118.9 mm), ZUMT 37563 (1, 109.5 mm),
ZUMT 37564 (1, 117.8 mm), ZUMT 37565 (1, 71.2 mm), ZUMT 37566 (1, 72.9 mm),
ZUMT 46476 (1, 90.5 mm), ZUMT 46524 (1, 125.1 mm), ZUMT 46525 (1, 124.2 mm),
ZUMT 46526 (1, 119.6 mm), ZUMT 62081 (1, 65.0 mm; no data)

ZUMT 62272 (1, 53.5 mm; no data, tagged as "13")

ZUMT 62273 (1, 38.6 mm; no data, tagged as "14")

ZUMT 62274 (1, 23.0 mm; no data, tagged as "15")

ZUMT 62275 (1, 23.2 mm; no data, tagged as "16")

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

JAPAN

ZUMT 14287 (1, 84.4 mm), ZUMT 14288 (1, 75.3 mm), ZUMT 14289 (1, 72.7 mm),
ZUMT 14290 (1, 112.2 mm), ZUMT 14291 (1, 77.7 mm), ZUMT 14292 [1, 78.7 mm;
probably from Ryukyu Archipelago; 23 Jan. 1925; coll. by H. Yashiro (Naha Fish
Market)]

ZUMT 14463 (1, 127.8 mm; Okinawa Pref.; coll. by S. Sakaguchi)

ZUMT 15170 (1, 137.0 mm), ZUMT 15204 [1, 119.1 mm; probably Okinawa-jima Island,
Ryukyu Archipelago; coll. by S. Sakaguchi (Okinawa Prefectural Daiichi Junior High
School)]

ZUMT 19958 (1, 122.0 mm; Ryukyu Archipelago)
ZUMT 23550 (1, 115.3 mm; probably from Okinawa Pref.; donation from Okinawa Prefectural Fisheries Experiment Station)
ZUMT 39753 (9, 63.8–147.4 mm), ZUMT 39754 (1, 133.1 mm), ZUMT 39755 (1, 130.5 mm; Ryukyu Archipelago; coll. by S. Sakaguchi)
ZUMT 40442 (1, 63.8 mm), ZUMT 40443 (1, 71.1 mm), ZUMT 40444 (2, 52.0–58.2 mm; Ryukyu Archipelago; coll. by S. Sakaguchi)
ZUMT 47701 (1, 108.9 mm; Okinawa-jima Island, Ryukyu Archipelago; July 1936; coll. by S. Inuo)
ZUMT 52591 (1, 130.0 mm; landed at Naha Fish Market, Naha City, Okinawa Pref.; 3 June 1966)
ZUMT 58099 (3, 32.2–34.2 mm; estuary of Nakama-gawa River, Iriomote-jima Island, Yaeyama Islands, Ryukyu Archipelago; 9 July 1988; coll. by H. Senou and M. Aizawa)

TAIWAN

ZUMT 22604 (1, 176.8 mm; Kaohsiung; coll. by S. Yamada)

CHINA

ZUMT 22793 (1, 100.8 mm; Hainan Island)

PHILIPPINES

ZUMT 12650 (1, 161.5 mm), ZUMT 12681 (1, 163.2 mm), ZUMT 12682 (1, 162.0 mm; Philippines; coll. by U. Yamamura)
ZUMT 40811 (1, 150.3 mm; Manila, Luzon; 11 Feb. 1909; coll. by I. Iijima and K. Aoki)
ZUMT 42122 (5, 85.8–99.3 mm; Philippines; Jan. 1938; coll. by U. Yamamura)
ZUMT 42138 (1, 87.1 mm), ZUMT 42147 (1, 165.1 mm), ZUMT 42148 (1, 97.7 mm), ZUMT 42166 (1, 78.0 mm), ZUMT 42200 (1, 87.3 mm), ZUMT 42202 (1, 87.4 mm), ZUMT 42246 (1, 164.0 mm), ZUMT 42252 (1, 115.2 mm), ZUMT 42253 (1, 83.6 mm); ZUMT 42254 (1, 112.9 mm; Philippines; 1926; coll. by U. Yamamura)
ZUMT 42323 (1, 154.9 mm), ZUMT 42354 (1, 182.2 mm), ZUMT 62073 (6, 64.9–96.0 mm; Basilan; 1926; coll. by U. Yamamura)

AUSTRALIA

ZUMT 62111 (1, 59.1 mm; probably from Australia; donation from Queensland Museum, Australia; tagged as “2789”)

LOCALITY UNKNOWN

ZUMT ABE 58-165 (1, 128.3 mm; no data)

Nematalosa japonica Regan, 1917 ドロクイ

JAPAN

- ZUMT 7883 (1, 201.2 mm; Hirajo Bay, Ainan Town, Ehime Pref.; 3 Feb. 1917; coll. by K. Otsuki)
ZUMT 17179 (1, 73.6 mm), ZUMT 17180 (1, 83.7 mm), ZUMT 17181 (1, 86.0 mm),
ZUMT 17182 (1, 76.8 mm), ZUMT 17183 (1, 83.1 mm), ZUMT 17184 (1, 70.6 mm);
Baten, Nanjo City, Okinawa-jima Island, Okinawa Pref.; coll. by S. Tanabe)
ZUMT 19570 (1, 104.0 mm; Urado Bay, Kochi City, Kochi Pref.; Oct. 1928; T. Kamohara)

TAIWAN

- ZUMT 5792 (1, 121.7 mm; Orchid Island)
ZUMT 13646 (1, 135.1 mm), ZUMT 13647 (1, 143.3 mm; Tamsui Port, Tamsui, Xinbei
City; coll. by T. Aoki)
ZUMT 14988 (1, 159.5 mm), ZUMT 14989 (1, 123.4 mm; Tainan; coll. by T. Aoki)
ZUMT 25098 (1, 110.2 mm), ZUMT 25110 (1, 103.8 mm; Taipei City; coll. by M. Imai)
ZUMT 62082 (1, 149.0 mm), ZUMT 62083 (1, 150.9 mm; purchased at Chitosecho Market,
Taipei City; 19 Nov. 1930)

CHINA

- ZUMT 22794 (1, 111.9 mm; Hainan Island)

PHILIPPINES

- ZUMT ABE 7794 (1, 77.3 mm; Basilan; 1926; coll. by U. Yamamura)

Remarks. Jordan and Evermann (1902) reported ZUMT 5792 as *Clupanodon nasus* (Bloch, 1795).

Sardina pilchardus (Walbaum, 1792)

LOCALITY UNKNOWN

- ZUMT 5787 (6, 69.9–111.5 mm; no data)

Sardinella albella (Valenciennes, 1847)

JAPAN

- ZUMT 17185 (1, 71.8 mm), ZUMT 17186 (1, 76.2 mm), ZUMT 17187 (1, 67.2 mm; Baten,
Nanjo City, Okinawa-jima Island, Okinawa Pref.; coll. by S. Tanabe)
ZUMT 40418 (1, 130.5 mm; Ryukyu Archipelago; coll. by S. Sakaguchi)

TAIWAN

- ZUMT 14832 (1, 106.6 mm), ZUMT 14833 (1, 105.0 mm), ZUMT 14835 (1, 109.4 mm; Taiwan; coll. by T. Aoki)
ZUMT 18465 (1, 114.3 mm; Keelung; Sept. 1927; coll. by H. Sato)
ZUMT 23598 [1, 68.5 mm; probably from Taiwan; donated by S. Arakawa (Taipei High School)]
ZUMT 25078 (1, 73.6 mm), ZUMT 25079 (1, 100.9 mm; estuary of Tamsui River, Xinbei City; Aug. 1930; coll. by M. Imai)
ZUMT 25096 (1, 100.9 mm), ZUMT 25097 (1, 97.5 mm; Keelung Port, Keelung; 1929; coll. by M. Imai)
ZUMT 62024 (1, 75.0 mm; purchased at Chitosecho Market, Taipei City; 19 Nov. 1930)
ZUMT 62025 (1, 85.5 mm; purchased at Chitosecho Market, Taipei City; 17 Nov. 1930)
ZUMT 62026 (1, 86.3 mm), ZUMT 62027 (1, 78.4 mm SL; purchased at Ximending Market, Taipei City; 14 Feb. 1931)
ZUMT 63275 (1, 76.9 mm; Tamsui, Xinbei City)

CHINA

- ZUMT 22795 (1, 89.2 mm), ZUMT 22796 (1, 100.6 mm; Hainan Island)

PHILIPPINES

- ZUMT 39505 (1, 92.9 mm; Philippines; coll. by U. Yamamura)
ZUMT 42031 (1, 43.9 mm; Philippines; 1926; coll. by U. Yamamura)
ZUMT 62066 (1, 52.5 mm; Philippines)

PALAU

- ZUMT 62022 (2, 90.7–95.4 mm; Palau; stored in same bottle with ZUMT ABE 5963 and 5964)

Remarks. Hata and Koeda (2022) reported ZUMT 17185, 17186, 17187, all collected from Okinawa-jima Island, as the first specimen-based records of *S. albella* from Japan.

Sardinella aurita Valenciennes, 1847 カタボシイワシ

CHINA

- ZUMT 54539 [1, dissected; Yellow Sea, east of Yancheng City, Jiangsu Province (34°05'N, 122°33'E), 25 m depth; 12 Oct. 1984; coll. by RV *8th Ten-yo-maru*]
ZUMT 54561 (1, 162.0 mm), ZUMT 54562 [1, 166.8 mm; Yellow Sea, east of Yancheng City, Jiangsu Province (34°15'N, 122°15'E), 25 m depth; 12 Oct. 1984; coll. by RV *8th Ten-yo-maru*]

EAST CHINA SEA

- ZUMT 51755 (1, 125.8 mm), ZUMT 51756 (1, 129.8 mm; East China Sea)

TAIWAN

ZUMT 12841 (1, 85.7 mm), ZUMT 12843 (1, 68.3 mm; Keelung; coll. by T. Aoki)
ZUMT 62014 (1, 154.2 mm; Penghu Islands, purchased at Magong Fish Market; 1 June 1970; coll. by Y. Tominaga)

PHILIPPINES

ZUMT 42142 (1, 123.7 mm), ZUMT 42167 (1, 122.7 mm), ZUMT 42168 (1, 131.1 mm),
ZUMT 42169 (1, 124.9 mm), ZUMT 42189 (1, 130.7 mm), ZUMT 42193 (1, 58.0 mm),
ZUMT 42233 (1, 121.5 mm), ZUMT 42234 (1, 80.3 mm), ZUMT 47006–47009 (4,
47.6–57.5 mm; Philippines; 1926; coll. by U. Yamamura)
ZUMT 62003 (1, 77.2 mm), ZUMT 62007 (4, 119.2–129.8 mm), ZUMT 62065 (43, 50.0–
75.6 mm; Basilan; 1926; coll. by U. Yamamura)

SURINAME

ZUMT 62495 (1, 145.2 mm; Suriname)

Remarks. See Stern et al. (2017) regarding the nomenclature of this species.

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

JAPAN

ZUMT 11236 (1, 93.1 mm), ZUMT 11237 [1, 91.6 mm; probably Okinawa-jima Island,
Ryukyu Archipelago; coll. by S. Sakaguchi (Okinawa Prefectural Daiichi Junior High
School)]

TAIWAN

ZUMT 14834 (1, 117.0 mm; Taiwan)
ZUMT 22616 (1, 86.2 mm; Kaohsiung; coll. by S. Yamada)

PHILIPPINES

ZUMT 12693 (1, 137.6 mm), ZUMT 12694 (1, 138.8 mm), ZUMT 39506 (1, 81.4 mm),
ZUMT 39507 (1, 72.3 mm; Philippines; coll. By U. Yamamura)

Sardinella goni Stern, Rinkevich & Goren, 2016

TAIWAN

ZUMT 62028 (1, 80.4 mm; probably obtained in fish market in Taipei City)

Remarks. This species, characterized by $19 + 13 = 32$ ventral scutes and $23-28 + 50-53$ gill rakers on the first gill arch, is known only from seven type specimens (129.8–144.1 mm standard length) collected from Boracay Island, Philippines (Stern et al. 2016). Although the ventral scute count of the present specimen matched that shown by Stern et al. (2016), the lower gill raker number on the first gill arch was less ($18 + 43$). However, the gill

raker counts of some clupeoid fishes, including some species of *Sardinella*, are known to increase with increasing body length (Whitehead 1985), and the difference in gill-raker count of the above specimens is considered here as representing intraspecific variation, due to their different body sizes.

***Sardinella hualiensis* (Chu & Tsai, 1958)**

TAIWAN

ZUMT 62005 (2, 79.5–89.5 mm; probably collected from Taiwan; 19 Oct. 1930)

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

PHILIPPINES

ZUMT 62013 (1, 82.5 mm; Basilan; 1926, coll. by U. Yamamura)

***Sardinella pacifica* Hata & Motomura, 2019**

PHILIPPINES

ZUMT 42041 (1, 101.4 mm), ZUMT 42149 (1, 105.7 mm), ZUMT 42171 (1, 106.3 mm),
ZUMT 42235 (1, 104.0 mm; Philippines; 1926; coll. by U. Yamamura)
ZUMT 62018 (1, 98.4 mm; Basilan; 1926; coll. by U. Yamamura)

Remarks. Identification of these specimens followed Hata and Motomura (2019b).

***Sardinella zunasi* (Bleeker, 1854) サツバ**

JAPAN

YAMAGATA PREF. ZUMT 62064 (7, 93.7–130.7 mm; Sakata City; 17 July 1933)

IBARAKI PREF. ZUMT 17895 (1, 86.6 mm; Hinuma Lake)

ZUMT 34533 (1, 104.2 mm; Hinuma Lake, Kamiishizaki, Ibaraki Town; 22 May 1935; coll. by S. Tanaka)

TOKYO MET. ZUMT 5790 (3, 95.1–97.4 mm; Tsukuda)

KANAGAWA PREF. ZUMT ABE 62-252 (1, 95.7 mm; Manazuru Town; coll. in Mar. to Apr. 1962)

ZUMT ABE 62-307, (1, 99.5 mm), ZUMT ABE 62-308 (1, 94.7 mm), ZUMT ABE 62-309 (1, 94.1 mm; Manazuru City; coll. in 17 Mar. to 21 Apr. 1962)

ZUMT 33719 (1, 91.5 mm; probably Misaki, Miura City)

ZUMT 62218 (1, 83.3 mm; probably Sagami Bay)

SHIZUOKA PREF. ZUMT 18538 (1, 115.0 mm), ZUMT 18539 (1, 105.8 mm), ZUMT 27163 (1, 77.0 mm), ZUMT 27164 (1, 87.3 mm; Hamana-ko Lake; coll. by S. Oe)

ZUMT 33369 (1, 92.9 mm; Shizuoka Pref.)
 ZUMT 33693 (1, 72.0 mm; Maisaka, Hamamatsu City; coll. by S. Oe)
TOYAMA PREF. ZUMT 41509 (1, 101.9 mm; Uozu City; June 1932; coll. by I. Tomiyama)
WAKAYAMA PREF. ZUMT 7517 (1, 84.5 mm), ZUMT 7518 [1, 82.1 mm; probably
 Wakayama Pref.; donated by I. Hoshino (Hiro, Arida, Wakayama City)]
 ZUMT 20293 (1, 108.0 mm; Wakayama Pref.)
 ZUMT 21727 (1, 108.7 mm; Wakayama Pref.; Oct. 1904)
 ZUMT 22037 (1, 128.4 mm; Wakayama Pref.; Jan. 1920)
OKAYAMA PREF. ZUMT 16525 (1, 97.2 mm; Kasaoka City; coll. by K. Matsushima)
SHIMANE PREF. ZUMT 31247 (1, 98.9 mm; Matsue City)
KOCHI PREF. ZUMT 47022 (1, 140.0 mm), ZUMT 47052 (1, 147.9 mm; Kochi Pref.)
FUKUOKA PREF. ZUMT 35102 (1, 93.5 mm), ZUMT 35103 (1, 90.6 mm), ZUMT 35104
 (1, 89.5 mm), ZUMT 35105 (1, 105.2 mm), ZUMT 35106 (1, 91.4 mm), ZUMT 35107
 (1, 75.2 mm), ZUMT 35108 (1, 101.1 mm), ZUMT 35109 (1, 76.6 mm), ZUMT 35110
 (1, 72.7 mm; Ariake Sea, off Okinohata, Yanagawa City; 28 May 1931; coll. by I.
 Tomiyama)
 ZUMT 35751 (1, 77.8 mm), ZUMT 35752 (1, 83.4 mm), ZUMT 35753 (1, 73.8 mm),
 ZUMT 35754 (1, 83.9 mm), ZUMT 35755 (1, 82.0 mm), ZUMT 35756 (1, 79.7 mm),
 ZUMT 35757 (1, 57.6 mm), ZUMT 35758 (1, 55.8 mm), ZUMT 35759 (1, 41.2 mm),
 ZUMT 35760 (1, 39.1 mm), ZUMT 35761 (1, 33.5 mm), ZUMT 35762 (1, 35.0 mm;
 Ariake Sea, off Okinohata, Yanagawa City; Oct. 1931; coll. by I. Tomiyama)
 ZUMT 50710 (1, 88.7 mm), ZUMT 50711 (1, 101.0 mm), ZUMT 50712 (1, 100.5 mm;
 purchased at Okinohata Fish Market, Yanagawa City; 10 Apr. 1959, Y. Tominaga)
 ZUMT 62070 (20, 16.0–31.8 mm SL; Ariake Sea, Yanagawa City; 10 June 1931; coll. by I.
 Tomiyama)
 ZUMT 62071 (9, 23.5–37.2 mm; Ariake Sea, Yanagawa City; 13 Aug. 1928; coll. by I.
 Tomiyama)
 ZUMT 62072 (12, 33.2–53.9 mm; Ariake Sea, Yanagawa City; June 1931; coll. by I.
 Tomiyama)
SAGA PREF. ZUMT 57349 (1, 100.6 mm; purchased at Kashima Fish Market, Kashima City;
 22 Sept. 1987; coll. by H. Senou and T. Saruwatari)
NAGASAKI PREF. ZUMT 2694 (1, 122.5 mm; Nagasaki Pref.; Mar. 1910)
 ZUMT 62044 (1, 131.2 mm; Omura Bay)
ARIAKE SEA ZUMT 18066 (1, 82.6 mm), ZUMT 18067 (1, 79.1 mm), ZUMT 18068 (1,
 92.7 mm; Ariake Sea; coll. by Fukuoka Prefectural Fisheries Experimental Station)
 ZUMT 50755 (1, 77.0 mm), ZUMT 50756 (1, 89.3 mm), ZUMT 50757 (1, 90.5 mm),
 ZUMT 50758 (1, 92.3 mm; Ariake Sea; 19 Apr. 1959; Y. Tominaga)
MIYAZAKI PREF. ZUMT 18827 (1, 64.3 mm), ZUMT 18829 (1, 70.7 mm), ZUMT 18830
 (1, 71.1 mm), ZUMT 18831 (1, 114.4 mm), ZUMT 18832 (1, 78.7 mm), ZUMT 20016
 (1, 69.3 mm), ZUMT 20017 (1, 69.0 mm), ZUMT 20018 (1, 67.0 mm), ZUMT 22669 (1,
 129.2 mm; Miyazaki Pref.)
 ZUMT 21150 (1, 132.9 mm; Miyazaki Pref.; coll. by Fukushima Fisheries Cooperative
 Association)

KAGOSHIMA PREF. ZUMT 5794 (1, 135.8 mm; Shibushi City; 7 Dec. 1902)

ZUMT 24028 (1, 75.4 mm; Shibushi City)

PRECISE LOCALITY UNKNOWN ZUMT 38296 (1, 76.2 mm), ZUMT 38297 (1, 70.2 mm; Japan)

BOHAI or YELLOW SEA

ZUMT 62067 (2, 48.1–64.4 mm; probably Bohai or Yellow seas; trawl; donation from Fisheries Experimental Station of Kwantung Agency)

LOCALITY UNKNOWN

ZUMT 37567 (1, 104.0 mm), ZUMT 37568 (1, 93.2 mm), ZUMT 37569 (1, 63.2 mm), ZUMT 46886 (1, 122.5 mm), ZUMT 46899 (1, 120.5 mm), ZUMT 57345 (2, 34.4–47.4 mm), ZUMT 62004 (1, 120.8 mm; no data)

ZUMT 62276 (1, 56.4 mm; no data, tagged as “17”)

***Sardinella* sp. 1**

(Fig. 1E–F)

PHILIPPINES

ZUMT 25470 (1, 73.9 mm; Philippines; 12 May 1933; coll. by A. W. C. T. Herre)

Remarks. The combination of characters of this specimen (dark spot on dorsal-fin origin; 61 lower gill rakers on 1st gill arch; grooves on body scales continuous centrally; 29 total scutes on abdomen; 8 pelvic-fin rays; and caudal fin without black markings) closely matched those of *Sardinella brachysoma* Bleeker, 1852, shown by Whitehead (1985) and Munroe et al. (1999). However, the former differed in having a distinctively slender body (28.9% of standard length vs. 30–39% in *S. brachysoma*) and lacking perforations or small pores posteriorly on the body scales (vs. numerous perforations posteriorly; Whitehead 1985; Munroe et al. 1999). The ZUMT specimen was also similar to *Sardinella hualiensis* (Chu & Tsai, 1958), both having similar in sharing the almost same numbers of lower gill rakers on the first gill arch (51–67 in *S. hualiensis*; Whitehead 1985; Hata and Motomura 2019a) and abdominal scutes (29–32), a black spot on the dorsal-fin origin, and a similar pattern of grooves on the body scales. However, the ZUMT specimen differed from *S. hualiensis* in having the caudal fin without black markings (vs. a black blotch on the tips of both lobes in *S. hualiensis*) and lacking perforations or small pores posteriorly on the body scales (vs. numerous perforations posteriorly; Whitehead 1985; Hata and Motomura 2019a).

Sardinella sp. 2

(Fig. 1G–H)

PHILIPPINES

ZUMT 25467 (1, 87.9 mm), ZUMT 25468 (1, 92.0 mm), ZUMT 25469 (1, 80.2 mm); Philippines; 12 May 1933; coll. by A. W. C. T. Herre)

Remarks. The specimens were identified as *Sardinella richardsoni* Wongratana, 1983, following the key given by Munroe et al. (1999): no dark markings on dorsal and caudal fins; 67–70 lower gill rakers on 1st gill arch (*S. richardsoni* has 63–74 gill rakers); grooves on body scales continuous centrally; 8 pelvic-fin rays; and caudal fin without black markings. However, they differed from the latter in having a distinctively slender body (29.5–31.0% of standard length vs. 32–36% in *S. richardsoni*) and no perforations or small pores posteriorly on the body scales (numerous perforations posteriorly; Whitehead 1985; Munroe et al. 1999). Although the ZUMT specimens were also similar to *Sardinella zunasi* (Bleeker, 1854), having similar body depth (body depth of *S. zunasi* 24–33% of standard length), fin coloration, and groove patterns on the body scales, *S. zunasi* has fewer lower gill rakers on the first gill arch (42–58) and small perforations posteriorly on the body scales (Whitehead 1985).

Sardinops caeruleus (Girard, 1854)

USA

ZUMT 17644 (1, 233.0 mm), ZUMT 17645 (1, 226.1 mm), ZUMT 17666 (1, 215.0 mm), ZUMT 17671 (1, 221.8 mm; California State; 1926–1927; coll. by S. Tanaka)

Sardinops melanostictus (Temminck & Schlegel, 1846) マイワシ

JAPAN

HOKKAIDO ZUMT 10764 (1, 67.5 mm; Kushiro City; Nov. 1962; coll. by M. Akiya)

ZUMT 10783 [1, 169.5 mm; probably collected from Kushiro City; donated by M. Akiya (Kushiro Fisheries Research Institute)]

ZUMT 10831 (1, 140.4 mm), ZUMT 10832 (1, 134.8 mm; probably collected from Hokkaido; 4 Nov. 1922, donation from Takashima Fisheries Research Institute)

AOMORI PREF. ZUMT 12985 (1, 133.0 mm), ZUMT 12986 (1, 116.1 mm), ZUMT 12992 (1, 73.2 mm; Koen-maehama, Aomori City; 4 Nov. 1923; coll. by S. Tanabe)

ZUMT 13210 (1, 109.3 mm), ZUMT 13211 (1, 110.3 mm), ZUMT 13212 (1, 106.0 mm), ZUMT 13213 (1, 136.6 mm; Shirogane-maehama, Hachinohe City; 28 Oct. 1923; coll. by S. Tanabe)

ZUMT 13310 (1, 197.5 mm; Fukaura; coll. by S. Tanabe)

ZUMT 41705 (1, 182.0 mm), ZUMT 41710 (1, 176.6 mm), ZUMT 41747 (1, 175.0 mm), ZUMT 41748 (1, 212.0 mm), ZUMT 41759 (1, 184.4 mm; Asamushi, Aomori City; coll. by S. Tanabe)

IWATE PREF. ZUMT 13052 (1, 144.6 mm), ZUMT 13053 (1, 122.9 mm; Sokei, Miyako City; coll. by S. Tanabe)
 ZUMT 13876 (1, 119.9 mm), ZUMT 13877 (1, 117.6 mm), ZUMT 13878 (1, 127.9 mm; Kesen Region; 20 Dec. 1924; coll. by G. Toba)

FUKUSHIMA PREF. ZUMT 26299 (1, 185.7 mm), ZUMT 33795 (1, 120.6 mm; Onahama, Iwaki City)

IBARAKI PREF. ZUMT 31645 (1, 144.3 mm), ZUMT 31646 [1, 112.9 mm; probably collected from Ibaraki Pref.; donated by K. Tashiro (Ibaraki Prefectural Fisheries Experimental Station)]

CHIBA PREF. ZUMT 56662 (1, 168.6 mm), ZUMT 56663 (1, 170.4 mm), ZUMT 56664 (1, 170.9 mm), ZUMT 56665 (1, 179.8 mm), ZUMT 56666 (1, 175.6 mm), ZUMT 56667 (1, 179.7 mm), ZUMT 56668 (1, 179.9 mm), ZUMT 56669 (1, 163.7 mm), ZUMT 62730 (1, 180.9 mm; Koyatsu, Tateyama City; 15 Apr. 1987; coll. by M. Aizawa, H. Senou, and Y. Sato)

TOKYO MARKET ZUMT 26385 (1, 156.3 mm), ZUMT 26386 (1, 155.9 mm; obtained at Tokyo Market, Tokyo Met.; June 1926; coll. by I. Tomiyama)

KANAGAWA PREF. ZUMT 5100 (1, 98.5 mm; Misaki, Miura City)
 ZUMT 27236 (1, 101.5 mm; Koajiro Bay, Aburatsubo, Miura City)
 ZUMT 27491 (1, 118.1 mm), ZUMT 27492 (1, 98.0 mm), ZUMT 27493 (1, 104.5 mm), ZUMT 27494 (1, 118.2 mm), ZUMT 27495 (1, 117.3 mm; Hayama Town)
 ZUMT 38310 (1, 51.5 mm), ZUMT 38311 (1, 41.0 mm; probably Misaki, Miura City)
 ZUMT 55632 (1, 191.2 mm), ZUMT 55633 (1, 103.1 mm), ZUMT 55634 (1, 98.4 mm; landed at Misaki Fish Market, Miura City; 29 July 1986)
 ZUMT 62006 (1, 143.4 mm; Zaimokuza, Kamakura City)

MIE PREF. ZUMT 23197 (1, 97.0 mm), ZUMT 23198 (1, 65.6 mm), ZUMT 23199 (1, 67.2 mm; Kimoto, Kumano City; 18 May 1930; coll. by Y. Tsuchiga)
 ZUMT 23419 (1, 171.8 mm; Owase City; coll. by K. Nakahara)
 ZUMT 38352 (1, 92.2 mm), ZUMT 38353 (1, 87.0 mm), ZUMT 38354 (1, 90.7 mm), ZUMT 38355 (1, 88.7 mm), ZUMT 38356 (1, 90.7 mm), ZUMT 38357 (1, 93.9 mm), ZUMT 38358 (1, 96.2 mm), ZUMT 38359 (1, 84.9 mm), ZUMT 38360 (1, 94.3 mm; Mie Prefectural Fisheries Research Institute, Hamajima, Shima City; Sept. 1920)

ISHIKAWA PREF. ZUMT 34190 (1, 50.8 mm), ZUMT 34191 (1, 48.8 mm), ZUMT 34192 (1, 57.1 mm; Shoinmachi, Suzu City)

KYOTO PREF. ZUMT 24373 (1, 95.1 mm), ZUMT 24374 (1, 91.4 mm; Miyazu City; Nov. 1931; coll. by Kyoto Prefectural Fisheries Training Center)

OKAYAMA PREF. ZUMT 16454 [1, 115.0 mm; probably collected from Okayama Pref.; donated by K. Matsushima (Kojokan Junior High School)]

SHIMANE PREF. ZUMT 31298 (1, 128.2 mm; Matsue City)

KOCHI PREF. ZUMT 18684 (1, 116.0 mm; Okino-shima Island, Sukumo City; Nov. 1926; coll. by T. Kamohara)

FUKUOKA PREF. ZUMT 49849 (1, 91.5 mm), ZUMT 49850 (1, 106.7 mm; Fukuoka Pref.)

NAGASAKI PREF. ZUMT 26491 (1, 137.1 mm; Takematsu, Omura City)
 ZUMT 27132 (1, 60.3 mm), ZUMT 27133 (1, 52.0 mm), ZUMT 27134 (1, 51.0 mm; Nagasaki Pref.)

ZUMT 48179 (1, 79.6 mm), ZUMT 48180 (1, 83.1 mm), ZUMT 49973 [1, 44.3 mm; Arikawa, Shinkamigoto Town (Nakadori-jima Island, Goto Islands); 25 May 1953; coll. by I. Tomiyama]

ZUMT 50017 (1, 123.2 mm), ZUMT 50018 [1, 137.7 mm; Fukue, Goto City (Fukue-jima Island, Goto Islands); 12 Oct. 1953; coll. by I. Tomiyama]

ZUMT 50333 (1, 134.6 mm; Hirado City; 10 June 1953; coll. by I. Tomiyama)

MIYAZAKI PREF. ZUMT 21175 (1, 37.2 mm; probably collected from Miyazaki Pref.; coll. by Fukushima Fisheries Cooperative Association)

KAGOSHIMA PREF. ZUMT 5795 (1, 140.8 mm; Shibushi City; 25 Oct. 1902)

ZUMT 5796 (1, 153.0 mm), ZUMT 5800 (1, 154.3 mm; Akune City)

ZUMT 5798 (1, 154.4 mm), ZUMT 5799 (1, 157.1 mm; Nomaike, Minamisatsuma City)

ZUMT 21962 (1, 127.6 mm; Kagoshima Pref.)

PRECISE LOCALITY UNKNOWN ZUMT 38291 (1, 59.8 mm; Japan)

ZUMT 53211 [1, 195.5 mm; although the ledger records the specimen as from “Kabira, Ishigaki-jima Island (Yaeyama Islands, Ryukyu Archipelago), Japan”, this species has never been recorded from the Ryukyu Archipelago (Aonuma and Yagishita, 2013a). The ledger entry is therefore likely to be erroneous.]

LOCALITY UNKNOWN

ZUMT ABE 9900 (5, 132.8–156.3 mm), ZUMT ABE 61-985 (1, 116.9 mm), ZUMT 62077 (1, 145.1 mm; no data)

ZUMT 62078 (1, 110.2 mm), ZUMT 62079 (1, 100.9 mm; locality unknown, tagged as “207”)

***Sardinops ocellatus* (Pappe, 1853)**

ZUMT 12278 (1, 189.9 mm), ZUMT 12280 (1, 119.3 mm; probably collected from the African coast; donation from British Museum)

***Sprattus sprattus* (Linnaeus, 1758)**

LOCALITY UNKNOWN

ZUMT 12279 (1, 99.5 mm; locality unknown; donation from British Museum)

***Tenualosia reevesii* (Richardson, 1846)**

CHINA

ZUMT 19100 (1, 343.7 mm; Shanghai)

ZUMT 21227 (1, 399.8 mm; China)

Acknowledgements

We are deeply grateful to the late Y. Tominaga for his dedication and efforts to the ZUMT collection. We thank I. Abe, S. Fujiwara, A. Iinuma, M. Saito, A. Takahashi, H. Ogata and other volunteers for the opportunity to examine the present specimens and giving curatorial assistance. We also greatly appreciated T. Yoshida (Marine Ecology Research Institute) for providing information on specimen collection sites and G. Hardy (Ngunguru, New Zealand) reading the manuscript and providing help with English. This study was supported in part by the Sasakawa Scientific Research Grant from the Japan Science Society (28-745, 2021-4064); a Grant-in-Aid from the Japan Society for the Promotion of Science for JSPS Fellows (DC2: 29-6652); JSPS KAKENHI Grant Numbers 19K23691 and 21K06313JP.

References

- Aonuma, Y. and Yagishita, Y. 2013a. Clupeidae, herrings. Pp. 297–301, 1811–1812. In: Nakabo, T. (ed) Fishes of Japan with pictorial keys to the species third edition. Tokai University, Press, Hadano. (In Japanese)
- Aonuma, Y. and Yagishita, Y. 2013b. Engraulidae, anchovies. Pp. 302–304, 1812–1813. In: Nakabo, T. (ed) Fishes of Japan with pictorial keys to the species third edition. Tokai University, Press, Hadano. (In Japanese)
- Aonuma, Y. and Yagishita, Y. 2013c. Chirocentridae, wolf-herrings. Pp. 305, 1813. In: Nakabo, T. (ed) Fishes of Japan with pictorial keys to the species third edition. Tokai University, Press, Hadano. (In Japanese)
- Birge, T. L., Ralph G. M., Di Dario, F., Munroe, T. A., Bullock, R. W., Maxwell, S. M., Santos, M. D., Hata, H. and Carpenter, K. E. 2021. Global conservation status of the world's most prominent forage fishes (Teleostei: Clupeiformes). *Biological Conservation*, 253: 108903.
- Bloom, D. D. and Egan, J. 2018. Systematics of Clupeiformes and testing for ecological limits on species richness in a trans-marine/freshwater clade. *Neotropical Ichthyology*, 16 (3): e180095.
- DiBattista, J. D., Randall, J. E. and Bowen, B. W. 2012. Review of the round herrings of the genus *Etrumeus* (Clupeidae: Dussumieriinae) of Africa, with description of two new species. *Cybium*, 36 (3): 447–460.
- Egan, J. P., Bloom, D. D., Kuo, C.-H., Hammer, M. P., Tongnunui, P., Iglésias, S. P., Sheaves, M. and Grudpan, C. 2018. Phylogenetic analysis of trophic niche evolution reveals a latitudinal herbivory gradient in Clupeoidei (herrings, anchovies, and allies). *Molecular Phylogenetics and Evolution*, 124: 151–161.
- Fricke, R. 2008. Authorship, availability and validity of fish names described by Peter (Pehr) Simon Forsskål and Johann Christian Fabricius in the 'Descriptiones animalium' by Carsten Niebuhr in 1775 (Pisces). *Stuttgarter Beiträge zur Naturkunde A, Neue Serie*, 1: 1–76.
- Gangan, S. S., Pavan-Kumar, A., Jahageerdar, S. and Jaiswar, A. K. 2020. A new species of *Stolephorus* (Clupeiformes: Engraulidae) from the Bay of Bengal. *Zootaxa*, 4743: 561–574.
- Hata, H. and Koeda, K. 2021. First voucher specimen of the endangered species *Thrissina baelama* (Teleostei: Clupeiformes: Engraulidae) from Okinawa-jima Island, Ryukyu Archipelago, Japan. *Fauna Ryukyuna*, 63: 11–15.

- Hata, H. and Koeda, K. 2022. First Japanese Records of *Sardinella albella* (Teleostei: Clupeiformes: Clupeidae) from Okinawa Island, with a key to Japanese species of *Sardinella*. Species Diversity, in press.
- Hata, H., Lavoué, S. and Motomura, H. 2019. Taxonomic status of seven nominal species of the anchovy genus *Stolephorus* described by Delsman (1931), Hardenberg (1933), and Dutt and Babu Rao (1959), with redescrptions of *Stolephorus tri* (Bleeker 1852) and *Stolephorus waitei* Jordan and Seale 1926 (Clupeiformes: Engraulidae). Ichthyological Research , 67 (1): 7–38.
- Hata, H., Lavoué, S. and Motomura, H. 2020. Redescrptions of *Dussumieria acuta* Valenciennes 1847 and *Dussumieria albulina* (Fowler 1934), two valid species of rainbow sardines (Clupeiformes: Dussumieriidae). Ichthyological Research, 68 (1): 126–138.
- Hata, H., Lavoué, S. and Motomura, H. 2021a. Taxonomic status of nominal species of the anchovy genus *Stolephorus* previously regarded as synonyms of *Stolephorus commersonii* Lacepède 1803 and *Stolephorus indicus* (van Hasselt 1823), and descriptions of three new species (Clupeiformes: Engraulidae). Ichthyological Research, 68 (3): 327–372.
- Hata, H., Lavoué, S. and Motomura, H. 2022. *Thrissina katana* sp. nov., a new thryssa from the western Pacific Ocean, and redescription of *Thrissina hamiltonii* (Gray, 1835) (Teleostei: Clupeiformes: Engraulidae). Marine Biodiversity, in press.
- Hata, H. and Motomura, H. 2016. Validity of *Encrasicholina pseudoheteroloba* (Hardenberg 1933) and redescription of *Encrasicholina heteroloba* (Rüppell 1837), a senior synonym of *Encrasicholina devisi* (Whiteley 1940) (Clupeiformes: Engraulidae). Ichthyological Research, 64 (1): 18–28.
- Hata, H. and Motomura, H. 2017. First record of the anchovy *Stolephorus teguhi* (Engraulidae) from the Philippines. Philippine Journal of Systematic Biology, 11 (2): 20–24.
- Hata, H. and Motomura, H. 2019a. A new species of sardine, *Sardinella pacifica* (Teleostei, Clupeiformes, Clupeidae), from the Philippines. ZooKeys, 829: 75–83.
- Hata, H. and Motomura, H. 2019b. A new species of sardine, *Sardinella electra* (Teleostei: Clupeiformes: Clupeidae), from the Ryukyu Islands, Japan. Zootaxa, 4565 (2): 274–280.
- Hata, H. and Motomura, H. 2019c. Two new species of *Thrissina* (Clupeiformes: Engraulidae) from the northern Indian Ocean and redescription of *Thrissina vitrirostris* (Gilchrist and Thompson 1908). Ichthyological Research, 67 (1): 155–166.
- Hata, H. and Motomura, H. 2020a. Assessment of standard Japanese name for the family Dussumieriidae (Clupeiformes). Ichthy, Natural History of Fishes of Japan, 1: 11–14.
- Hata, H. and Motomura, H. 2020b. Proposal of a new standard Japanese name for the family Spratelloididae (Clupeiformes). Ichthy, Natural History of Fishes of Japan, 3: 10–15.
- Hata, H. and Motomura, H. 2021a. Assessment of standard Japanese name for the family Pristigasteridae (Clupeiformes). Ichthy, Natural History of Fishes of Japan, 4: 18–21.
- Hata, H. and Motomura, H. 2021b. A new species of the anchovy genus *Stolephorus* Lacepède 1803 from North Sumatra, Indonesia, and redescrptions of *Stolephorus pacificus* Baldwin 1984 and *Stolephorus teguhi* Kimura, Hori and Shibukawa 2009 (Teleostei: Clupeiformes: Engraulidae). Zoological Studies, in press.

- Hata, H., Psomadakis, P. N., Osmany, H. B. and Motomura, H. 2021b. A new species of *Thrissina* from Pakistan (Arabian Sea), with redescription of *Thrissina whiteheadi* (Wongratana 1983) (Clupeiformes: Engraulidae). *Ichthyological Research*, 68 (4): 486–495.
- Jordan, D. S. and Evermann, B. W. 1902. Notes on a collection of fishes from the island of Formosa. *Proceedings of the United States National Museum*, 25 (1289): 315–368.
- Kottelat, M. 2013. The fishes of the inland waters of Southeast Asia: a catalogue and core bibliography of the fishes known to occur in freshwaters, mangroves and estuaries. *Raffles Bulletin of Zoology Supplement*, 27: 1–663.
- Lavoué, S., Bertrand, J. A. M., Chen, W.-J., Ho, H.-C., Motomura, H., Sado, T. and Miya, M. 2017. Phylogenetic position of the rainbow sardine *Dussumieria* (Dussumieriidae) and its bearing on the early evolution of the Clupeoidei. *Gene*, 623: 41–47.
- Munroe, T. A., Wongratana, T. and Nizinski, M. S. 1999. Clupeidae, herrings (also, sardines, shad, sprats, pilchard, and menhadens). Pp. 1775–1821. In: Carpenter, K. E. and Niem, V. H. (eds), *FAO species identification guide for fishery purposes. The living marine resources of the western central Pacific. Vol. 3. Batoid fishes, chimaeras and bony fishes part 1 (Elopidae to Linophrynidae)*. FAO, Rome.
- Randall, J. E. and DiBattista, J. 2012. *Etrumeus makiawa*, a new species of round herring (Clupeidae: Dussumierinae) from the Hawaiian Islands. *Pacific Science*, 66: 97–110.
- Singh, M., Teena, Jayakumar, T. K., Kumar, T. T. A., Murali, S., Mishra, A., Singh, A. and Lal, K. K. 2021. Integrative taxonomy-based discovery of *Dussumieria modakandai* sp. nov. from India. *Journal of Fish Biology*, 89 (5): 2282–2305.
- Statistics Department of Ministry of Agriculture, Forestry and Fisheries, Japan. 2021. 2020 fishery and aquaculture production statistics. Statistics Department of Ministry of Agriculture, Forestry and Fisheries, Japan, Tokyo. 54 pp. (In Japanese)
- Stern, N., Rinkevich, B. and Goren, M. 2016. Integrative approach revises the frequently misidentified species of *Sardinella* (Clupeidae) of the Indo-West Pacific Ocean. *Journal of Fish Biology*, 89 (5): 2282–2305.
- Stern, N., Douek, J., Goren, M. and Rinkevich, B. 2017. With no gap to mind: a shallow genealogy within the world's most widespread small pelagic fish. *Ecography*, 41 (3): 491–504.
- Whitehead, P. J. P. 1985. *FAO species catalogue. Vol. 7. Clupeoid fishes of the world (suborder Clupeoidei). An annotated and illustrated catalogue of the herrings, sardines, pilchards, sprats, anchovies and wolf-herrings. Part 1 – Chirocentridae, Clupeidae and Pristigasteridae*. *FAO Fisheries Synopsis*, 7 (pt. 1): 1–303.
- Whitehead, P. J. P., Nelson, G. J. and Wongratana, T. 1988. *FAO species catalogue. Vol. 7. Clupeoid fishes of the world (suborder Clupeoidei). An annotated and illustrated catalogue of the herrings, sardines, pilchards, sprats, anchovies and wolf-herrings. Part 2, Engraulidae*. *FAO Fisheries Synopsis*, No. 125, 7 (pt. 2): i–viii + 305–579.
- Wongratana, T., Munroe, T. A., and Nizinski, M. S. 1999. Engraulidae, anchovies. Pp. 1698–1753. In: Carpenter, K. E. and Niem, V. H. (eds) *FAO species identification guide for fishery purposes. The living marine resources of the western central Pacific. Vol. 3. Batoid fishes, chimaeras and bony fishes part 1 (Elopidae to Linophrynidae)*. FAO, Rome.



Figure 1. Specimens of Clupeiformes deposited in the Department of Zoology, The University Museum, The University of Tokyo (ZUMT). (A) *Dussumieria* sp. [ZUMT 39748, 136.9 mm standard length (SL); Okinawa Prefecture, Japan]; (B) *Stolephorus teguhi* (ZUMT 62055, 67.2 mm SL; Jolo Island, Philippines); (C) *Thrissina* sp. (ZUMT 44497, 114.9 mm SL; probably collected from Korea); (D) *Herklotsichthys* sp. (ZUMT ABE 11061, 110.4 mm SL; collection locality unknown); (E) lateral view of body and (F) stained scale removed from right side of midbody (just above anal fin; left-right inverted) of *Sardinella* sp. 1 (ZUMT 25470, 73.9 mm SL; Philippines); (G) stained scale removed from right side of midbody (just below dorsal fin; left-right inverted) and (H) lateral view of body of *Sardinella* sp. 2 (ZUMT 25468, 92.0 mm SL; Philippines)

Report on the specimens of order Polymixiidae (Teleostei: Polymixiiformes) deposited in the Department of Zoology, The University Museum, The University of Tokyo

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Abstract

The collection of Polymixiidae (Teleostei: Polymixiiformes) deposited in the Department of Zoology, The University Museum, The University of Tokyo (ZUMT) were re-identified in the present study. In total 28 specimens in 27 lots were discovered. No types are known for this family in ZUMT collection. A specimen of *Polymixia sazonomi* Kotlyar, 1992, collected from Suruga Bay, represents the first record from the area, and northernmost and easternmost records of the species. In addition, a single specimen (ZUMT 18855) of *Polymixia longispina* Deng, Xiong & Zhan, 1983 represents the first record of the species from Kagoshima Prefecture.

Introduction

The fish collection of family Polymixiidae (Teleostei: Polymixiiformes) which preserved in the Department of Zoology, The University Museum, The University of Tokyo (ZUMT) were re-identified in the present study. The family Polymixiidae is a deep-sea fish group, which only the family of the order Polymixiiformes. The family comprises a single genus *Polymixia* Lowe, 1836 with 10 species and an unidentified species known from southern Taiwan (Koeda 2019; Fricke et al. 2021). Four of these species have previously been recorded from Japanese waters (Hayashi 2013).

Materials and Methods

The specimens of Polymixiidae in ZUMT were re-identified in the present study, generally following Kotlyar (1993) and Hayashi (2013), together with some unpublished taxonomic studies, and confirmation of at least one diagnostic character. The standard length (SL) of the specimens were measured for all specimens. Species are arranged in alphabetical order by species name. Japanese were given in parentheses for local name and personal name when these written in Japanese in the specimen ledger. The list contains ZUMT number, SL, collection locality, collection date, collector or donator, collection method, and remarks when available. No type specimens deposited for Polymixiidae in ZUMT.

Collection of Polymixiidae in ZUMT

Examination of the specimens of Polymixiidae deposited at ZUMT disclosed 27 lots with 28 specimens. We confirmed a single genus and 4 species which all known from Japan. No types are known for this family in ZUMT collection. A single specimen (ZUMT 54676; Fig. 1) of *Polymixia sazonovi* Kotlyar, 1992 collected from Suruga Bay was discovered from the collection. The present specimen represents the first record from the area, and northernmost and easternmost records of the species. In addition, a single specimen (ZUMT 18855; Fig. 2) of *Polymixia longispina* Deng, Xiong & Zhan, 1983 represents the first record of the species from Kagoshima Prefecture. A single specimen of *Polymixia japonica* Günther, 1877 (ZUMT 3485) which referred by Tanaka (1913) was not found.

Polymixiidae ギンメダイ科

Polymixia Lowe, 1836 ギンメダイ属

Polymixia berndti Gilbert, 1905 アラメギンメ

ZUMT 23369: 137.3 mm SL, Owase (尾鷲), Mie Pref., from 1922 to 1948, donated from K. Nakahara (中原鋼作) who is a director of Owase Girls High School of Owase Town, Mie Prefecture (三重県尾鷲町尾鷲高等女学校).

Remarks: This species previously known from Boso Peninsular, Sagami Bay, Kumano-nada Sea, and Tosa Bay in the Pacific coast of southern Japan (Kubo et al. 2012; Hayashi 2013). Local name “Shiro-mutsu (シロムツ)”.

Polymixia japonica Günther, 1877 ギンメダイ

ZUMT 2571: 129.1 mm SL, Nagasaki Pref., 24 Oct. 1909.

ZUMT 3696: 2 specimens, 125.3 mm SL, 128.9 mm SL, Nagasaki Pref. 11 Nov.

Remarks: Although the collection date of ZUMT 3696 was not recorded on the specimen ledger, it was estimated as having been during the period (1890's to 1920's) when Ichiro Kaneko (金子一狼) sent many fish specimens to Shigeo Tanaka (田中茂穂).

ZUMT 5086: 109.6 mm SL, Tokyo Fish Market (東京市場).

ZUMT 5087: 106.4 mm SL, **ZUMT 5088:** 104.8 mm SL, **ZUMT 5089:** 118.5 mm SL: Misaki (三崎), Kanagawa Pref., written as Soshu (相州).

ZUMT 5090: 115.6 mm SL, Odawara (小田原), Kanagawa Pref.

ZUMT 5091: 126.6 mm SL, **ZUMT 5092:** 110.3 mm SL, **ZUMT 5093:** 114.9 mm SL, **ZUMT 5094:** 116.3 mm SL, **ZUMT 5095:** 135.2 mm SL: locality unknown, probably Tokyo Fish Market.

ZUMT 9917: 112.0 mm SL, Wakayama Pref., from 1915 to 1948, donated from S. Sakaguchi (坂口総一郎) at Kaiso Junior High School (海草中学校).

ZUMT 21771: 164.9 mm SL, Amami-oshima Island (奄美大島) written as Oshima (大島), Jan. 1899, donated from A. Owston.

ZUMT 21825: 114.1 mm SL, Kagoshima Pref.

ZUMT 23816: 118.8 mm SL, Naya (納屋), Kagoshima City, Kagoshima Pref.

ZUMT 24269: 140.1 mm SL, Mimase (御豊瀬), Kochi Pref., 20 Oct. 1931, donated from T. Kamohara (蒲原稔治).

ZUMT 25367: 94.8 mm SL, off 200 hiro (尋) (= ca. 360 m) of Shima (志摩), collected at Toyohama Fish Market (豊浜漁港市場) at western coast of Chita Peninsular (知多半島), from 1912 to 1943, donated from S. Munekane (宗兼宗一) at Girls High School of Aichi Prefecture (愛知県女子師範学校).

ZUMT 54681: 109.4 mm SL, off Kunouzan (久能山), Suruga Bay (駿河湾), Shizuoka Pref., 9 May 1983, bottom trawl.

ZUMT 62060, 120.8 mm SL, **ZUMT 62061:** 131.6 mm SL, **ZUMT 62062:** 85.1 mm SL: no data (previously uncataloged).

Polymixia longispina Deng, Xiong & Zhan, 1983 キララギンメ

ZUMT 8517: 89.0 mm SL, Tanabe (田辺), Wakayama Pref., 23 Aug. probably 1920's, donated from N. Ui (宇井縫蔵).

ZUMT 18855 (Fig. 2): 118.8 mm SL, Kagoshima Pref.

Remarks: The species previously known from Suruga Bay, Kii Channel, Tosa Bay, Bungo Channel, and Okinawa Trough in Japanese waters. The present specimen represents the first record of the species from Kagoshima Prefecture.

Polymixia sazonomi Kotlyar, 1992 オカムラギンメ

ZUMT 54676 (Fig. 1): 239.9 mm SL, off Kunouzan, Suruga Bay, Shizuoka Pref., 9 May 1983.

Remarks: The species originally described on the basis of the specimens collected from Kyushu-Palau Ridge (Kotlyar 1992), and were reported from Atsumi Peninsular in Aichi Prefecture (Senou 2006), Yoron Island (Endo 2014) and Ishigaki-jima Island (Koeda and Hirasaka in press) in the Ryukyu Archipelago, and southern Taiwan (Koeda 2019) up to now. The present specimen represents the first record of the species from Suruga Bay, and northernmost and easternmost distributional records of the species.

Acknowledgements

We are deeply grateful to the late Y. Tominaga for his dedication and efforts to the ZUMT collection. We are also grateful to H. Hata (National Museum of Nature and Science), I. Abe, S. Fujiwara, A. Iinuma, M. Saito, A. Takahashi (Tokyo University of Marine Science and Technology), and H. Ogata (ZUMT) for curatorial assistance. G. S. Hardy (Ngunguru, New Zealand) kindly improved the English in the manuscript. The present study was supported in part by JSPS KAKENHI 21K06313 JP and the Sasakawa Scientific Research Grant from The Japan Science Society (2021-4064) for the first author.

References

- Endo, H. 2014. *Polymixia sazonomi*. P. 60. In: Motomura, H. and Matsuura, K. (eds) Field guide to fishes of Yoron Island in the middle of the Ryukyu Islands, Japan. The Kagoshima University Museum, Kagoshima and the National Museum of Nature and Science, Tsukuba. (In Japanese)
- Fricke, R., Eschmeyer, W.N., Van der Laan, R. (eds). 2021. Eschmeyer's catalog of fishes: genera, species, references. Electronic version.
<https://researcharchive.calacademy.org/research/ichthyology/catalog/getref.asp?id=20773>. Accessed 31 July 2021
- Hayashi, Y. (2013) Polymixiidae. Pp. 481, 1866–1867. In: Nakabo, T. (ed) Fishes of Japan with pictorial keys to the species, 3rd edition. Tokai University Press, Hadano. (In Japanese)
- Koeda, K. 2019. Family Polymixiidae. Pp. 342–346. In: Koeda, K. and Ho, H.-C. (eds) Fishes of southern Taiwan. National Museum of Marine Biology & Aquarium, Pingtung, Taiwan.
- Koeda, K. and Hirasaka, H. 2021. Records of two deep-sea fishes, *Beryx splendens* (Beryciformes; Berycidae) and *Polymixia sazonomi* (Polymixiiformes; Polymixiidae), collected from off Ishigaki-jima Island. *Kuroshio Biosphere*, 18 (2): 29–37. (In Japanese with English abstract)
- Kotlyar, A.N. 1992. A new species of the genus *Polymixia* from the submarine Kyushu-Palau Ridge, and notes on other representatives of the genus (Polymixiidae, Beryciformes). *Voprosy Ikhtiologii*, 32 (6): 11–26. (In Russian)
- Kotlyar, A.N. 1993. A new species of the genus *Polymixia* from the submarine Kyushu-Palau Ridge, and notes on other representatives of the genus (Polymixiidae, Beryciformes). *Voprosy Ikhtiologii*, 33 (3): 30–49. (In Russian)
- Kubo, Y., Kawabata, S., Asai, T., Hanasaki, K., Takeuchi, H., Okumura, D., Yamano, H. and Hosoya, K. 2012. Annotated checklist of the fish caught by an off-shore trawl fishery in the Kumanonada Sea, Mie Prefecture, Japan. *Memoirs of the Faculty of Agriculture of Kinki University*, 45: 193–239. (In Japanese with English abstract)
- Senou, H. 2006. *Diretmichthys parini* and *Polymixia sazonomi*. *News letter of the Kanagawa Prefectural Museum of Natural History*, 12 (2): 9. (In Japanese)
- Tanaka, S. 1913. Figures and descriptions of the fishes of Japan including Riukiu Islands, Bonin Islands, Formosa, Kurile Islands, Korea, and Southern Sakhalin. *Volo.* 12: 203–220, pls. 56–59.



Figure 1. ZUMT 54676: *Polymixia sazonomi*, 239.9 mm SL, collected from off Kunouzsan, Suruga Bay, Shizuoka Prefecture, Japan.



Figure 2. ZUMT 18855: *Polymixia longispina*, 118.8 mm SL, collected from Kagoshima Prefecture, Japan.

Report on the specimens of family Chaetodontidae (Teleostei: Perciformes) deposited in the Department of Zoology, The University Museum, The University of Tokyo with comments on distributional shifted in these 100 years

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Abstract

The collection of Chaetodontidae (Teleostei: Perciformes) held in the Department of Zoology, The University Museum, The University of Tokyo (ZUMT) comprise 433 lots, including 449 specimens representing seven genera and 40 species, most of which were collected in the early 20th century. Presence of the holotype of *Coradion fulvocinctus* Tanaka, 1918 was confirmed. Although many chaetodontid species recently distributed along the Pacific coast of southern Japan can be considered as examples of abortive migration, few specimens in the ZUMT collection appeared to be indicative of such, the historical collection instead reflecting past distributional characteristics of each species.

Introduction

The butterflyfish family Chaetodontidae (Teleostei: Perciformes), one of the most representative coral reef fish groups (Nakamura 2003), has been studied from many angles, including social structure, feeding habits, and relationships with corals (Bouchon-Navaro, 1986; Zekeria et al., 2006). On the Pacific coast of southern Japan, the family is also known as an abortive migration group, juveniles of various southern species appearing during summer, but apparently dying in winter without reproducing (Hagiwara and Hasegawa 1990; Koeda 2018). Such fishes dispersed mainly from tropical areas during their early life history. However, in recent years their quality and abundance have changed, as they became more common in temperate areas, with some species overwintering (Hirata et al. 2011; Nakamura et al. 2013).

Because the fish collection in the Department of Zoology, The University Museum, The University of Tokyo (ZUMT) was mainly acquired from Japan and overseas during the late 18th and early 19th centuries, it is of significant value as direct evidence of the distribution of some fish species during that period. Since the butterflyfishes have shown the most dramatic changes in their distributional ranges, the specimens held in ZUMT are listed below.

Materials and Methods

Identities of the Chaetodontidae specimens in ZUMT were confirmed by the first author, generally following Burgess (1978) and Shimada (2013), with confirmation of at least one

diagnostic character. Standard lengths (SL) were measured for all specimens, which are arranged in alphabetical order by species. Local name, and collector's name and affiliation are given where known (from the specimen catalog or tag), with Japanese language equivalents in parentheses. The following list includes ZUMT number, SL, with number of specimens in parentheses when two or more, type (abbreviated when non-type), collection locality, collection date, collector or donator and affiliation, collection method, and remarks when available. Although, some of the ZUMT specimens collected by Dr. Abe had not been formally cataloged into the ZUMT collection (and the data of some specimens not retained), such specimens which can recognize by having underbar with the number on the accompanying label, are listed herein with the number ZUMT ABE XXXX, due to the possibility of future discovery of Dr. Abe's remaining catalog books with collection data.

Collection of Chaetodontidae in ZUMT

Examination of the specimens of Chaetodontidae deposited in ZUMT comprised 449 specimens [40 species (all known from Japan) in seven genera] in 433 lots, including the holotype of *Coradion fulvocinctus* Tanaka, 1918, presently recognized as a junior synonym of *Coradion altivelis* McCulloch, 1916.

Distributional shifted of Chaetodontidae in these 100 years

The Faculty of Science, The University of Tokyo has a long history of collecting fish specimens from all over Japan between 1900 and 1940. This is largely due to the relationship of Tanaka Shigeo with schoolteachers, fishery experiment station staff, and volunteers from all over Japan, with a particularly large number of specimens donated from Chiba, Kanagawa, Shizuoka, Wakayama, Kochi, Nagasaki, and Okinawa prefectures. For butterflyfishes before 1940, especially many specimens from Okinawa were donated by S. Sakaguchi (坂口総一郎), H. Yashiro (矢代弘孝), and T. Tanabe (田辺貞夫), and from the Philippines by U. Yamamura (山村樞次郎), but very few specimens from the Pacific coast of mainland Japan, and only the following specimens likely represented abortive migration at that time:

Chaetodon argentatus Smith & Radcliffe, 1911: ZUMT 39705, juvenile, ZUMT 42823, juvenile (Hachijo-jima Island)

Chaetodon auriga Forsskal, 1775: ZUMT 28298, 28299, 34352, juvenile (Chiba Pref.), ZUMT 26856, juvenile (Awaji-shima Island)

Chaetodon citrinellus Cuvier, 1831: ZUMT 37910, subadult (Izu Peninsula, Shizuoka Pref.)

Chaetodon ephippium Cuvier, 1831: ZUMT 26857, ZUMT 26858, juveniles (Awaji-shima Island), ZUMT 35253, juvenile, (Hamamatsu, Shizuoka Pref.), ZUMT 43662, ZUMT 55423, juveniles (Misaki, Kanagawa Pref.)

Chaetodon kleinii Bloch, 1790: ZUMT 26276, subadult (Okino-shima Island, Kochi Pref.)

Chaetodon lineolatus Cuvier, 1831: ZUMT 26276, adult (Onahama, Fukushima Pref.), probably adult transportation (see Koeda in press).

Chaetodon plebeius Cuvier, 1831: adult (Okino-shima Island, Kochi Pref.)

Chaetodon vagabundus Linnaeus, 1758: ZUMT 34351, juvenile (Okitsu, Chiba Pref.), ZUMT 42824, subadult (Hachijo-jima Island)

In contrast, large numbers of variously-sized specimens of seven species, *Chaetodon auripes* Jordan & Snyder, 1901, *Chaetodon guentheri* Ahl, 1923, *Chaetodon nippon* Steindachner & Döderlein, 1883, *Coradion altivelis* McCulloch, 1916, *Heniochus acuminatus* (Linnaeus, 1758), *Heniochus diphreutes* Jordan 1903, and *Roa modesta* (Temminck & Schlegel, 1844), collected from the Pacific coast of southern Japan before 1940, were found in the collection, indicating that such species were better adapted to temperate waters than the remaining 33 species. Furthermore, the paucity of specimens of the latter suggests that they were very rare or not distributed off the Pacific coast of southern Japan in the early 19th century. The comparison of the result and the distribution of each species shown by Shimada (2013) reveal that the distributions of the butterflyfishes were dramatically shifted in these 100 years (Table 1). 23 species expanded their distribution northward from tropical area (north to Amai) to temperate area (Pacific coast of southern Japan), and nine species slightly expanded northward in temperate area. *Chaetodon auriga* is one of the most noticeably changed their distribution that the species known before 1940 from Amai (adult) and Chiba (juvenile), but now from Mie (adult) and Iwate (juvenile). Based on the results, this species is now more adapted to colder regions than other six temperate species (except for *C. auripes* which known from Aomori), even though it was assumed to have been abortive migration species before 1940.

Because the ZUMT butterflyfish collection provides likely evidence of historical distributional characteristics of each species, compared with subsequent dramatic changes in the distributional range of some, the entire collection is a valuable historical asset that cannot now be replicated.

Chaetodontidae チョウチョウウオ科

Chaetodon Linnaeus, 1758 チョウチョウウオ属

Chaetodon argentatus Smith & Radcliffe, 1911 カガミチョウチョウウオ

ZUMT 14253: 84.2 mm SL; **ZUMT 14254:** 82.2 mm SL; **ZUMT 14255:** 82.3 mm SL; **ZUMT 14256:** 80.3 mm SL; **ZUMT 14257:** 86.6 mm SL; **ZUMT 14258:** 82.0 mm SL, Naha Fish Market (那覇魚類市場), Naha, Okinawa Pref., 2 Feb. 1925, donated by H. Yashiro (屋代弘孝).

Remarks: Hirotaka Yashiro was a technician in Okinawa Prefecture, who studied Okinawan entomology from 1922 to 1944 (Higashihirachi 1962).

ZUMT 16903: 90.6 mm SL, Onna (恩納), Okinawa Pref., between 1920 and 1930, S. Tanabe (田辺貞夫).

ZUMT 39705: 36.6 mm SL, Hachijo-jima Island (八丈島), Aug. 1931, S. Masuda (増田繁雄).

ZUMT 39946: 78.0 mm SL; **ZUMT 39974:** 78.1 mm SL; **ZUMT 45760,** 81.3 mm SL; **ZUMT 45781,** 84.2 mm SL, Ryukyu (琉球), probably Okinawa-jima Island (沖縄島), specimens received on Mar. 1925, S. Sakaguchi (坂口総一郎).

ZUMT 40424 (cloth tag “14”): 82.9 mm SL, Ryukyu, probably Okinawa-jima Island, between 1921 and 1923, S. Sakaguchi.

- ZUMT 42823:** 40.0 mm SL, Hachijo-jima Island, Sept. 1922, M. Uchiyama (内山 操).
ZUMT 53425: 76.5 mm SL, Ishigaki-jima Island (石垣島).
ZUMT 62225 (plastic tag MA-064): 83.3 mm SL, Kii Peninsula (紀伊半島), 1970's, donation from Shirahama Aquarium, Kyoto University (京都大学白浜水族館) to M. Aizawa.
ZUMT ABE 6050: 84.2 mm SL, Palau, 1930's, T. Abe.

Chaetodon auriga Forsskål, 1775 トゲチヨウチヨウウオ

- ZUMT 11107:** 102.1 mm SL, Basilan Island, Philippines, between May 1925 and April 1926, U. Yamamura (山村榎次郎).
Remarks: Umejiro Yamamura was a palm plantation superintendent on Basilan Island, southern Philippines from May 1925 to April 1926 (Kuroda 1927). He and his family collected and donated a large number of specimens from the area, including fishes, birds, insects, and corals.
- ZUMT 13732:** 79.2 mm SL, Naha, Okinawa Pref., July 1921, C. Gusukuma (城間朝教) (Women's School, Okinawa Prefecture) (沖縄県女子師範学校).
ZUMT 15330: 131.1 mm SL, Okinawa-jima Island, from 1920 to 1930, S. Sakaguchi.
ZUMT 16986 (cloth tag I-16 “イ十六”): 91.4 mm SL, Itoman (糸満), Okinawa-jima Island, between 1920 and 1930, K. Tanabe.
ZUMT 17254: 34.6 mm SL, Unten (運天), Okinawa-jima Island, between 1920 and 1930, S. Tanabe (a student collector in Okinawa) (沖縄学生採).
Remarks: Local name in Okinawa “Fubicya (フウビチャ)”.
- ZUMT 17278:** 128.2 mm SL, Yaeyama Islands (八重山諸島), between 1920 and 1930, S. Tanabe (a student in the Fishing Department of Fisheries School) (水産学校漁労科).
ZUMT 22881: 67.7 mm SL, Ryukyu, probably Okinawa-jima Island, between 1920 and 1930.
ZUMT 26856: 43.4 mm SL, Fukura (福良), Awaji-shima Island (淡路島), Hyogo Pref., 5 Mar. 1912, R. Uchimura (内村柳太郎).
ZUMT 28298: 15.1 mm SL; **ZUMT 28299,** 15.1 mm SL, Chiba Pref., 1927, S. Obama (小浜秀) (Women's School, Chiba Prefecture) (千葉県女子師範).
ZUMT 34352: 18.7 mm SL, Okitsu (興津), Katsuura (勝浦), Chiba Pref., Aug. 1930, S. Masuda.
ZUMT 40387: 138.3 mm SL, Kagoshima, received on June 1938, K. Ogawa (小川一男) (Women's School, Kagoshima Prefecture) (鹿児島女子師範).
ZUMT 40715 (cloth tag of 128): 82.6 mm SL, Amami-oshima Island, received on Nov. 1922, K. Enoya (榎屋兼武) (Junior High School, Kagoshima Prefecture) (鹿児島県立大島中学校).
Remarks: Local name in Kagoshima “Kasabera (カサベラ)”.
- ZUMT 41653:** 158.7 mm SL; **ZUMT 41654:** 146.9 mm SL; Ogasawara Islands, donated by S. Fujimori (藤森三郎).
ZUMT 42650, 51.5 mm SL, Ryukyu, probably Okinawa-jima Island, received on Mar. 1925, S. Sakaguchi.

ZUMT 62177: 122.2 mm SL; **ZUMT 62178:** 112.2 mm SL; **ZUMT 62179:** 67.5 mm SL;
ZUMT 62180: 46.3 mm SL; **ZUMT 63060:** 37.1 mm SL, specimens previously
uncataloged, detailed data unknown.
ZUMT ABE 2882: 83.9 mm SL; **ZUMT ABE 4150:** 29.8 mm SL; **ZUMT ABE 4151:** 25.3
mm SL; **ZUMT ABE 4152:** 45.2 mm SL; **ZUMT ABE 5606:** 63.4 mm SL, Palau, T. Abe.

Chaetodon auripes Jordan & Snyder, 1901 チョウチョウウオ

ZUMT 13966: 116.2 mm SL, Okinawa-jima Island, from 1920 to 1930, S. Sakaguchi at
Daiichi Junior High School of Okinawa Prefecture (沖縄県立第一中学校).
ZUMT 17372: 81.9 mm SL; **ZUMT 17438:** 52.0 mm SL, Naha, Okinawa-jima Islands, S.
Tanabe and Y. Hiyane (比屋根良隆).
ZUMT 18602: 121.4 mm SL, Susaki, Kochi Pref., Oct. 1928 (received on 28 Nov. 1928), T.
Kamohara (蒲原稔治) (Kochi High School) (高知高等学校).
ZUMT 19116: 153.8 mm SL, Mitsune Beach (三根海岸), Hachijo-jima Island, 2 July 1929,
Y. Otsuki (大槻洋四郎), collected by spear.
ZUMT 20093: 51.0 mm SL, Ujiamada (宇治山田), Ise (伊勢), Mie Pref., Y. Tsuchiga (槌賀
安平).
ZUMT 20506: 102.4 mm SL; **ZUMT 20507** (2 specimens, each with a cloth tag in differing
handwriting): 120.8 mm SL, 97.5 mm SL, Ryukyu, probably Okinawa-jima Island, Apr.,
1909, S. Watase (渡瀬庄三郎) and H. Kuwano (桑野久任).
ZUMT 23213: 105.3 mm SL; **ZUMT 23214:** 102.5 mm SL, Kata Bay (賀田湾), Mie Pref., Y.
Tsuchiga (Kimoto Junior High School) (木本中学校), donated by T. Koide (小出哲夫).
ZUMT 25121: 102.8 mm SL, Taipei (台北), Taiwan (台湾), M. Imai (今井倭武) (Medical
School, Taipei) (台北医学専門学校), collected by Kinchaku-ryo (キンチャク漁).
ZUMT 28300: 43.3 mm SL, Chiba Pref., S. Obama (Women's School, Chiba Prefecture).
ZUMT 33856: 37.9 mm SL, Shizuura (静浦), Numazu (沼津), Shizuoka Pref., N. Kuroda (黒
田長礼).
Remarks: Although the ZUMT collection catalog records the specimen as “donated by Dr.
Kuroda (黒田博士寄贈)”, without noting the name of the collector, the latter is considered
to have been Nagamichi Kuroda, an ornithologist who worked with S. Tanaka (Tanaka et
al. 1933), and who also collected and donated many specimens to ZUMT.
ZUMT 34016: 42.3 mm SL, Yokohama (横浜) or Ninomiya (二宮), Kanagawa Pref.
ZUMT 34353: 24.9 mm SL; **ZUMT 34354,** 24.1 mm SL, Okitsu, Katsuura, Chiba Pref., Aug.
1930, S. Masuda.
ZUMT 34729: 22.2 mm SL, Numazu, Shizuoka Pref., S. Yamamoto (山本末吉氏) (Numazu
Junior High School) (沼津中学校).
ZUMT 34790: 21.0 mm SL; **ZUMT 34791,** 28.1 mm SL, Japan.
ZUMT 40701: 109.1 mm SL, Hachijo-jima Island.
ZUMT 46577: 118.5 mm SL, Hachijo-jima Island, in jar with ZUMT 46576 (Exocoetidae).
ZUMT 47026: 92.6 mm SL, Kochi Pref., in jar with ZUMT 47013 (Monacanthidae), T.
Kamohara.

ZUMT 48318: 67.0 mm SL, Aburatsubo (油壺), Miura, Kanagawara Pref., 1935, T. Abe.
ZUMT 53320: 94.8 mm SL, Ishigaki-jima Island, Sato.
ZUMT 56880: 37.4 mm SL, tidepool at Joga-shima Island, Kanagawa Pref., 2 Aug. 1987.
ZUMT 62229 (cloth tag of 0118): 41.2 mm SL; **ZUMT 62230** (cloth tag of 0053): 35.5 mm SL; **ZUMT 62237**: 21.4 mm SL; **ZUMT 63118**: 38.4 mm SL; **ZUMT 63119**: 38.3 mm SL; **ZUMT 62988**: 27.8 mm SL; **ZUMT 62989**: 27.9 mm SL; **ZUMT 63050**: 29.5 mm SL; **ZUMT 62987**: 38.1 mm SL; **ZUMT 62990**: 24.0 mm SL, localities unknown.

Chaetodon baronessa Cuvier, 1829 ミカドチョウチョウウオ

ZUMT ABE 3919: 80.3 mm SL, Palau, 1930's, T. Abe.
ZUMT 11101: 91.6 mm SL; **ZUMT 11110**: 96.4 mm SL, Philippines, between May 1925 and April 1926, U. Yamamura.
ZUMT 20509: 97.5 mm SL, Ryukyu, probably Okinawa Island, Apr. 1909, S. Watase and H. Kuwano.

Chaetodon bennetti Cuvier, 1831 ウミヅキチョウチョウウオ

ZUMT 13952: 120.6 mm SL, Okinawa Island, between 1920 and 1930, S. Sakaguchi.

Chaetodon citrinellus Cuvier, 1831 ゴマチョウチョウウオ

ZUMT 17122: 97.9 mm SL; **ZUMT 17123**: 81.2 mm SL, Onna, Okinawa-jima Island, between 1920 and 1930, S. Tanabe.
ZUMT 37910: 83.3 mm SL, Nirayama, Shizuoka Pref., M. Agata (阿方 勝) (Nirayama Junior High School) (韮山中学校).
ZUMT 39971: 86.7 mm SL, Ryukyu, probably Okinawa Island, between 1920 and 1930, S. Sakaguchi.
ZUMT 41168 (cloth tag 125): 90.3 mm SL, Amami-oshima Island, collected on 18 Feb. 1921, received on 3 Feb. 1922, K. Enoya (榎屋兼武) (Junior High School, Kagoshima Prefecture) (鹿児島県立大島中学校).
Remarks: Local name "Kasabera".
ZUMT ABE 4147: 27.3 mm SL, Palau, 1930's, T. Abe.

Chaetodon daedalma Jordan & Fowler, 1902 ユウゼン

ZUMT 19115: 142.6 mm SL, Mitsune Beach, Hachijo-jima Island, 2 July 1929, Y. Otsuki, collected by spear.

ZUMT 19247: 153.1 mm SL; **ZUMT 19303**: 148.0 mm SL, Mitsune Beach, Hachijo-jima Island, received on 22 July 1929, Y. Oshitsu (押津義雄).

ZUMT 19941: 130.2 mm SL, Ogasawara Islands, before 1930, S. Fujimori (藤森三郎).

Remarks: Referred to and figured in Tanaka (1930a,b).

ZUMT 19942 (cloth tag of sketch No. 234 “写生二百三十四号”): 136.3 mm SL, Ogasawara Islands, before 1930, S. Fujimori (藤森三郎).

Remarks: May have been collected with ZUMT 19941, but not referred to in Tanaka (1930a,b).

Chaetodon ephippium Cuvier, 1831 セグロチヨウチヨウウオ

ZUMT ABE 3176: 76.2 mm SL; **ZUMT ABE 3177**: 82.4 mm SL; **ZUMT ABE 3912**: 83.7 mm SL; **ZUMT ABE 3914**: 116.3 mm SL; **ZUMT ABE 3918**: 112.1 mm SL; **ZUMT ABE 4149**: 45.2 mm SL: Palau, 1930's, T. Abe.

ZUMT 11047: 155.5 mm SL, Philippines, between May 1925 and April 1926, U. Yamamura.

ZUMT 11270: 172.2 mm SL, Okinawa-jima Island, between 1921 and 1923, S. Sakaguchi.

ZUMT 26857: 25.9 mm SL; **ZUMT 26858**: 29.0 mm SL, Fukura, Awaji-shima Island, 5 Mar. 1912, R. Uchimura (内村柳太郎).

ZUMT 35253: 22.8 mm SL, Hamamatsu, Shizuoka Prefecture, S. Araki (荒木精一) (Women's High School, Hamamatsu City) (浜松市立浜松高等女学校).

ZUMT 43264: 22.1 mm SL, locality unknown.

ZUMT 43662: 26.4 mm SL, Misaki.

ZUMT 55423: 3 specimens, 19.3 mm SL, 21.3 mm SL, 22.9 mm SL, Misaki, 16 Aug. 1911.

ZUMT 62203: 6 specimens, 18.0–37.1 mm SL, locality unknown.

ZUMT 62218 (plastic tag MA-062): 95.9 mm SL, Kii Peninsula, 1970's, donation from Shirahama Aquarium, Kyoto University to M. Aizawa.

Chaetodon guentheri Ahl, 1923 コクテンカタギ

ZUMT 24306: 84.4 mm SL, Mimae, Kochi Pref., 21 Jan. 1931, T. Kamohara.

ZUMT 62175: 64.6 mm SL; **ZUMT 62176**: 62.9 mm SL, locality unknown.

Chaetodon kleinii Bloch, 1790 ミヅレチヨウチヨウウオ

ZUMT 11272: 96.7 mm SL; **ZUMT 15095**: 84.6 mm SL; **ZUMT 15112**: 83.0 mm SL, Okinawa-jima Island, between 1921 and 1923, S. Sakaguchi.

ZUMT 14278: 88.6 mm SL; **ZUMT 14279**: 87.6 mm SL; **ZUMT 14280**: 93.6 mm SL; **ZUMT 14281**: 97.4 mm SL, Naha Fish Market, Naha, Okinawa Pref., 23 Jan. 1925, H. Yashiro.

ZUMT 15067: 75.2 mm SL, Naha, Okinawa Pref., probably 1925, H. Yashiro.

ZUMT 17072 (cloth tag I-41 “イ四一”): 71.2 mm SL, Itoman, Okinawa-jima Island, between 1920 and 1930, K. Tanabe.

ZUMT 17313: 80.1 mm SL, Yaeyama Islands, K. Tanabe (a student collector at Fishing Department of Fisheries School).

ZUMT 22595: 93.2 mm SL, Okino-shima Island (沖の島), Kochi Pref., T. Kamohara.

ZUMT 26909: 85.8 mm SL, Naze Port (名瀬港), Amami-oshima Island (奄美大島), 31 Aug. 1934.

ZUMT 31843: 49.8 mm SL, Buton Island, Indonesia.

ZUMT 41169(cloth tag 125): 79.6 mm SL, Naze Port, Amami-oshima Island, collected on 18 July 1921, received on 3 Feb. 1922, K. Enoya (Junior High School, Kagoshima Prefecture).
Remarks: Local name “Kasabera”.

ZUMT 44918: 90.2 mm SL, Market at Zamboanga, Mindanao, Philippines, Feb. 1929, M. Hachisuka (蜂須賀正氏).

Remarks: Masauji Hachisuka was an ornithologist and aviculturist who visited Mindanao Island for bird research in 1929. His research group climbed Apo Mountain on 11th Feb. that year, following which he visited Zamboanga (Hachisuka 2006).

ZUMT ABE 3924: 83.2 mm SL; **ZUMT ABE 3925:** 77.2 mm SL; **ZUMT ABE 6049:** 82.2 mm SL, Palau, 1930's, T. Abe.

Chaetodon lineolatus Cuvier, 1831 ニセフウライチョウウオ

ZUMT 26276: 205.1 mm SL, Onahama, Fukushima Pref., Dec. 1932.

Remarks. The present specimen represents the northernmost record of the species (Koeda in press)

ZUMT 37444: 108.2 mm SL, Pengfu, Taiwan, July 1908.

ZUMT ABE 2918: 193.6 mm SL; **ZUMT ABE 3917:** 166.1 mm SL, Palau, 1930's, T. Abe.

Chaetodon lunula (Lacepède, 1802) チョウハン

ZUMT 29683: 52.6 mm SL, Nyagu (皆川) at Okinoerabu-jima Island (沖永良部島), Amami Islands, 25 Aug. 1909, Miyashita (宮下).

ZUMT 49085: 150.9 mm SL, Fordate, Indonesia, 31 Jan. 1955, donated by Z. Maekawa (前川善四郎) and T. Suzuki (鈴木貞次郎) to I. Tomiyama.

ZUMT 55422: 16.7–34.9 mm SL, 6 specimens, tidepool at Onna, Okinawa-jima Island, 2 Apr. 1925.

ZUMT 63304: 66.6 mm SL, locality unknown.

Chaetodon lunulatus Quoy & Gaimard, 1825 ミスジチョウウオ

ZUMT ABE 3908: 86.4 mm SL; **ZUMT ABE 3909:** 62.2 mm SL; **ZUMT ABE 3910:** 89.9 mm SL; **ZUMT ABE 3911:** 88.0 mm SL; **ZUMT ABE 4923:** 102.7 mm SL; **ZUMT ABE**

5605: 93.7 mm SL; **ZUMT ABE 6051**: 95.7 mm SL; **ZUMT ABE 6052**: 110.0 mm SL; **ZUMT ABE 6053**: 92.8 mm SL, Palau, 1930's, T. Abe.

ZUMT 4777: 101.3 mm SL, 102.4 mm SL, 2 specimens, **ZUMT 4778**: 95.4 mm SL, Ryukyu Archipelago, Apr. 1909, S. Watase and Kohno.

Remarks: Shozaburo Watase (Tokyo Imperial University) was a zoologist who focused his research on the biogeography of the northern Ryukyu Archipelago.

ZUMT 11051: 98.8 mm SL; **ZUMT 11053**: 86.8 mm SL, Philippines, from May 1925 to April 1926, U. Yamamura (山村樺次郎).

ZUMT 11261 (cloth tag of 148): 106.6 mm SL; **ZUMT 13963**: 100.6 mm SL; **ZUMT 13964**: 88.2 mm SL, Okinawa Island, from 1920 to 1930, S. Sakaguchi (Daiichi Junior High School, Okinawa Prefecture).

ZUMT 14302: 87.2 mm SL, Naha Fish Market (那覇魚類市場), Naha, Okinawa Pref., 6 Feb. 1925, donated by H. Yashiro.

ZUMT 14604: 82.8 mm SL, Philippines.

ZUMT 16972 (cloth tag I-42 “イ四二”): 79.4 mm SL, Itoman, Okinawa-jima Island, T. Tanabe.

ZUMT 17121: 79.3 mm SL; **ZUMT 17226**: 87.4 mm SL, Unten, Okinawa-jima Island, T. Tanabe.

Remarks: Local name “Fubicha (フウビチャ)”.

ZUMT 17305: 92.8 mm SL, Yaeyama Islands, T. Tanabe.

ZUMT 17350: 101.2 mm SL, Naha, Okinawa-jima Islands, S. Tanabe and Y. Hiyane.

ZUMT 19524 (cloth tag 56): 95.8 mm SL, Itoman, Okinawa-jima Island, 23 May 1928, T. Tanabe.

Remarks: Local name “Anlagasa (アンラガーサー)”.

ZUMT 31845: 55.5 mm SL; **ZUMT 31846**: 53.8 mm SL, Buton Island, Indonesia.

ZUMT 39802: 89.9 mm SL; **ZUMT 39899**: 74.0 mm SL; **ZUMT 39900**: 76.2 mm SL, Ryukyus, probably Okinawa-jima Island, received on Mar. 1925, S. Sakaguchi (Daiichi Junior High School, Okinawa Prefecture).

ZUMT 40062: 86.3 mm SL, Kyan Cape, Okinawa-jima Island, 12 Apr. 1901, K. Mitsukuri (箕作佳吉) and I. Ikeda (池田岩治).

Remarks: Kakichi Mitsukuri and Iwaji Ikeda (Tokyo and Kyoto Universities, respectively) were zoologists who worked during both the Meiji and Taisho eras.

ZUMT 40714 (cloth tag 128): 105.4 mm SL, Amami-oshima Island, collected on 22 July 1921, received on Nov. 1922, K. Enoya (Junior High School, Kagoshima Prefecture).

ZUMT 44924: 91.3 mm SL; **ZUMT 44925**: 101.1 mm SL, Market at Zamboanga, Mindanao, Philippines, Feb. 1929, M. Hachisuka.

ZUMT 53326: 98.2 mm SL; **ZUMT 53328**: 91.2 mm SL, Ishigaki-jima Island, Yaeyama Islands, Sato.

ZUMT 54079: 89.9 mm SL, Kuji, Amami-oshima Island, Y. Tominaga (富永義昭).

ZUMT 62312: 15.2 mm SL, Nishidomari, Otsuki, Kochi, 6 Sept. 2021, K. Koeda (小枝圭太), 3 m depth, hand net.

ZUMT 62181 (cloth tag 80): 95.8 mm SL, Ryukyu Archipelago, 10 May 1921, S. Sakaguchi.

Chaetodon melannotus Bloch & Schneider, 1801 アケボノチョウチョウウオ

- ZUMT 11108**: 95.3 mm SL, Philippines, between May 1925 and April 1926, U. Yamamura.
ZUMT 11251 (cloth tag 149): 113.9 mm SL; **ZUMT 14485**: 115.1 mm SL; **ZUMT 15129**: 94.4 mm SL; **ZUMT 39903**: 95.5 mm SL; **ZUMT 39975**: 99.7 mm SL; **ZUMT 45775**: 85.3 mm SL; **ZUMT 45776**: 92.4 mm SL, probably Okinawa-jima Island, specimens received on 24 Mar. 1925, S. Sakaguchi (Daiichi Junior High School, Okinawa Prefecture).
ZUMT 14303: 109.0 mm SL, Naha Fish Market, Naha, Okinawa Pref., 6 Feb. 1925, donated by H. Yashiro.
ZUMT 22763: 40.8 mm SL; **ZUMT 39740**: 40.9 mm SL, Okinawa-jima Island.
ZUMT 22880: 42.4 mm SL, Ryukyu Archipelago.
ZUMT 62231 (cloth tag 0020): 52.2 mm SL; **ZUMT 63261**: 41.9 mm SL; **ZUMT 63262**: 3 specimens, 19.7–35.8 mm SL; **ZUMT 63306**: 39.6 mm SL, locality unknown.
ZUMT 62310: 54.6 mm SL, Nishidomari, Otsuki, Kochi, 6 Sept. 2021, K. Koeda, 3 m depth, hand net.

Chaetodon meyeri Bloch & Schneider, 1801 オウギチョウチョウウオ

- ZUMT ABE 2963**: 85.9 mm SL; **ZUMT ABE 2964**: 124.4 mm SL; **ZUMT ABE 2965**: 121.6 mm SL, Palau, 1930's, T. Abe.

Chaetodon nippon Steindachner & Döderlein, 1883 シラコダイ

- ZUMT 12420**: 111.2 mm SL, 111.2 mm SL, Misaki.
ZUMT 62191: 95.1 mm SL; **ZUMT 62192**: 106.6 mm SL; **ZUMT 62193**: 118.2 mm SL; **ZUMT 62194**: 124.3 mm SL; **ZUMT 62195**: 56.8 mm SL; **ZUMT 62236**: 121.2 mm SL, locality unknown.

Chaetodon octofasciatus Bloch, 1787 ヤスジチョウチョウウオ

- ZUMT 62219** (plastic tag MA-076): 55.4 mm SL, Kii Peninsular, 1970's, donation from Shirahama Aquarium, Kyoto University to M. Aizawa.

Chaetodon oligacanthus Bleeker, 1850 テンツキチョウチョウウオ

- ZUMT 12329**: 85.2 mm SL, Kagoshima? (probably Amami-oshima Island).
ZUMT 25537: 73.9 mm SL; **ZUMT 25538**: 69.9 mm SL; **ZUMT 25539**: 82.2 mm SL; **ZUMT 25540**: 113.3 mm SL, Philippines, identified on 12 May 1933 by A. W. Herre (Stanford University).

ZUMT 40960: 27.2 mm SL, Jolo, Sulu Islands, Philippines, Feb. 1909, I. Ijima (飯島魁) and K. Aoki (青木熊吉).

Remarks: Isao Ijima and Kumakichi Aoki (both University of Tokyo) were an ichthyologist and specimen collector, respectively.

ZUMT 41031: 70.4 mm SL, Singapore, 12 Mar. 1910, I. Ijima and K. Aoki.

ZUMT 42144: 87.3 mm SL; **ZUMT 42154:** 81.1 mm SL; **ZUMT 42291:** 84.8 mm SL, Philippines, 1926, U. Yamamura.

ZUMT 42344: 84.7 mm SL, Basilan, Philippines, 1926, U. Yamamura.

ZUMT 62224: 61.4 mm SL, locality unknown.

Chaetodon ornatissimus Cuvier, 1831 ハナグロチヨウチヨウウオ

ZUMT 15111: 84.7 mm SL; **ZUMT 15329:** 109.6 mm SL, probably from Okinawa Island, from 1920 to 1930, S. Sakaguchi (Daiichi Junior High School, Okinawa Prefecture).

ZUMT 17351: 102.9 mm SL, Naha, Okinawa-jima Islands, S. Tanabe and Y. Hiyane.

ZUMT 20497: 113.1 mm SL; **ZUMT 20498:** 132.4 mm SL; **ZUMT 20499:** 131.1 mm SL, Ryukyu Archipelago, Apr. 1909, S. Watase and H. Kuwano.

ZUMT 2962: 124.2 mm SL; **ZUMT 5987:** 129.2 mm SL, Palau, 1930's, T. Abe.

Chaetodon oxycephalus Bleeker, 1853 ヒメフウライチヨウチヨウウオ

ZUMT 25502: 148.0 mm SL, Philippines, identified on 12 May 1933 by A.W. Herre (Stanford University).

Chaetodon plebeius Cuvier, 1831 スミツキトノサマダイ

ZUMT 14304: 107.3 mm SL, Naha Fish Market, Naha, Okinawa Pref., 6 Feb. 1925, H. Yashiro.

ZUMT 15126: 102.2 mm SL; **ZUMT 15137:** 98.2 mm SL; **ZUMT 15373:** 99.5 mm SL, probably from Okinawa Island, between 1920 and 1930, S. Sakaguchi (Daiichi Junior High School, Okinawa Prefecture).

ZUMT 17048 (cloth tag I-40 “イ四十”): 104.7 mm SL, Itoman, Okinawa-jima Island, between 1920 and 1930, K. Tanabe.

ZUMT 18876: 114 mm SL, Okino-shima Island, Kochi Pref., July 1926, T. Kamohara (Kochi High School).

ZUMT 19525 (cloth tag 56): 100.8 mm SL, Itoman, Okinawa-jima Island, 23 May 1928, T. Tanabe.

Remarks: Local name “Anlagasa (アンラガーサー)”.

ZUMT 26910: 114.4 mm SL, Kagoshima Pref., 31 Aug. 1934.

ZUMT 39805: 99.3 mm SL; **ZUMT 39904:** 79.8 mm SL; **ZUMT 39972:** 95.1 mm SL; **ZUMT 45759:** 104.5 mm SL, probably from Okinawa Island, between 1920 and 1930, S. Sakaguchi.

ZUMT 53327: 90 mm SL, Ishigaki-jima Island, Yaeyama Islands, Sato.

ZUMT 54085: 74.1 mm SL, Kuji, Amami-oshima Island, Y. Tominaga.

ZUMT 62182 (plastic tag MA-075): 65.4 mm SL, Kii Peninsular, 1970's, donation from Shirahama Aquarium, Kyoto University to M. Aizawa.

ZUMT ABE 6054: 94.2 mm SL; **ZUMT ABE 6055:** 79.1 mm SL, Palau, 1930's, T. Abe.

Chaetodon punctatofasciatus Cuvier, 1831 シチセンチョウチョウウオ

ZUMT 15069: 83.7 mm SL, Naha, Okinawa-jima Island, H. Yashiro.

ZUMT 15172: 74.8 mm SL, probably from Okinawa Island, between 1920 and 1930, S. Sakaguchi.

ZUMT 62174 (plastic tag MA-071): 74.3 mm SL, Kii Peninsular, 1970's, donation from Shirahama Aquarium, Kyoto University to M. Aizawa.

ZUMT ABE 6048: 83.9 mm SL, Palau, 1930's, T. Abe.

Chaetodon reticulatus Cuvier, 1831 ハクテンカタギ

ZUMT 62198: 133.9 mm SL; **ZUMT 62199:** 93.7 mm SL, locality unknown.

Chaetodon selene Bleeker, 1853 テングチョウチョウウオ

ZUMT 31842: 95.6 mm SL, Buton Island, Indonesia.

ZUMT 53950: 51.8 mm SL, locality unknown, Yasuda.

ZUMT 55421: 69.8 mm SL, Osezaki, Suruga Bay, July 1972.

Chaetodon semeion Bleeker, 1855 レモンチョウチョウウオ

ZUMT 62207: 88.2 mm SL, locality unknown.

ZUMT ABE 3915: 130.1 mm SL; **ZUMT ABE 3916:** 116.5 mm SL, Palau, 1930's, T. Abe.

Chaetodon speculum Cuvier, 1831 トノサマダイ

ZUMT 11050: 105.5 mm SL; **ZUMT 11054:** 65.7 mm SL, Philippines, from May 1925 to April 1926, U. Yamamura.

ZUMT 31844: 46.3 mm SL, Buton Island, Indonesia.

- ZUMT 37422:** 72.0 mm SL, Pengfu, Taiwan, July 1906.
ZUMT 46839: 122.1 mm SL, Taipei, Taiwan, received on 5 Aug. 1933.
ZUMT 54603: 77.2 mm SL, Fish market at Puerto Princesa, Palawan Island, Philippines, M. Aizawa.
ZUMT ABE 4148: 38.1 mm SL, Palau, 1930's, T. Abe.

Chaetodon trifascialis Quoy & Gaimard, 1825 ヤリカタギ

- ZUMT 11052:** 105 mm SL, Philippines, from May 1925 to April 1926, U. Yamamura.
ZUMT 13957: 96.4 mm SL; **ZUMT 15097:** 93.7 mm SL; **ZUMT 15128:** 105.1 mm SL, Okinawa-jima Island, between 1920 and 1930, S. Sakaguchi (Daiichi Junior High School, Okinawa Prefecture).
ZUMT 14274: 99.2 mm SL; **ZUMT 14275:** 112.1 mm SL; **ZUMT 14276:** 104 mm SL; **ZUMT 14277:** 110.5 mm SL, Naha Fish Market, Naha, Okinawa-jima Island, 2 Feb. 1925, H. Yashiro.
ZUMT 14591: 101.2 mm SL, Philippines.
ZUMT 26908: 107.1 mm SL, Naze Port, Amami-oshima Island, received by ZUMT on 31 Aug. 1934.
ZUMT 39945: 100.2 mm SL, locality unknown.
ZUMT 41170 (cloth tag 125): 103.1 mm SL, Naze Port, Amami-oshima Island, collected on 18 July 1921, received on 3 Feb. 1922, K. Enoya (Junior High School, Kagoshima Prefecture).
Remarks: Local name "Kasabera".
ZUMT 62190 (plastic tag of MA-065): 72.6 mm SL, Kii Peninsular, 1970's, donation from Shirahama Aquarium, Kyoto University to M. Aizawa.
ZUMT ABE 3923: 86.2 mm SL; **ZUMT ABE 5606:** 85.2 mm SL; **ZUMT ABE 6047:** 102.3 mm SL, Palau, 1930's, T. Abe.

Chaetodon unimaculatus Bloch, 1787 イッテンチョウチョウウオ

- ZUMT 4779:** 119.4 mm SL, Ryukyu Archipelago, Apr. 1909, S. Watase and Kohno.
ZUMT 11228 (cloth tag 145): 123.2 mm SL; **ZUMT 15192:** 81.4 mm SL, Okinawa-jima Island, between 1920 and 1930, S. Sakaguchi (Daiichi Junior High School, Okinawa Prefecture).
ZUMT 12330: 113.7 mm SL, probably Amami-oshima Island, Kagoshima Prefecture.
ZUMT 14268: 64.6 mm SL; **ZUMT 14269:** 112.5 mm SL; **ZUMT 14270:** 90.3 mm SL; **ZUMT 14271:** 72.6 mm SL; **ZUMT 14272:** 92.1 mm SL; **ZUMT 14273:** 84.8 mm SL, Naha Fish Market, Naha, Okinawa-jima Island, 2 Feb. 1925, H. Yashiro.
ZUMT 14492: 114.1 mm SL; **ZUMT 39803:** 88.5 mm SL; **ZUMT 39804:** 87.6 mm SL; **ZUMT 39901:** 98.6 mm SL; **ZUMT 39902:** 82.5 mm SL; **ZUMT 39973:** 65.7 mm SL, probably Okinawa-jima Island, specimens received on 24 Mar. 1925, S. Sakaguchi.

- ZUMT 15068:** 71.2 mm SL, Naha, Okinawa-jima Island, 2 Feb. 1925, H. Yashiro.
ZUMT 20184: 99.6 mm SL, Kagoshima (probably Amami-oshima Island).
ZUMT 20504: 131.5 mm SL, Ryukyu Archipelago, Apr. 1909, S. Watase and H. Kuwano.
ZUMT 26863: 116.9 mm SL, Naze Port, Amami-oshima Island.

Chaetodon vagabundus Linnaeus, 1758 フウライチヨウチヨウウオ

- ZUMT 11106:** 105.2 mm SL, Philippines, from May 1925 to April 1926, U. Yamamura.
ZUMT 11225 (cloth tag 140): 124.1 mm SL; **ZUMT 15194:** 119.3 mm SL, Okinawa-jima Island, between 1920 and 1930, S. Sakaguchi (Daiichi Junior High School, Okinawa Prefecture).
ZUMT 17105: 121.1 mm SL, Onna, Okinawa-jima Island, between 1920 and 1930, S. Tanabe.
ZUMT 21804: 110.2 mm SL, Ryukyu Archipelago (probably Amami-oshima Island), T. Mukai (向井常治) (Miyakonojo Junior High School, Miyazaki Prefecture).
ZUMT 29682: 52.2 mm SL, Nyagu at Okinoerabu-jima Island, Amami Islands, 25 Aug. 1909, Miyashita.
ZUMT 34351: 27.6 mm SL, Okitsu, Katsuura, Chiba Pref., Aug. 1930, S. Masuda.
ZUMT 42648: 45.0 mm SL; **ZUMT 42649:** 40.1 mm SL; **ZUMT 45761:** 48.0 mm SL; **ZUMT 45762:** 60.3 mm SL, probably Okinawa-jima Island, specimens received in Mar. 1925, S. Sakaguchi.
ZUMT 42824: 50.1 mm SL, Hachijo-jima Island, Sept. 1922, M. Uchiyama
ZUMT 54604: 81.0 mm SL, Fish market at Puerto Princesa, Palawan Island, Philippines, M. Aizawa.
ZUMT 62222: 58.0 mm SL; **ZUMT 62223** (cloth tag of 0,009): 39.8 mm SL; **ZUMT 63305:** 50.8 mm SL, locality unknown.
ZUMT 3920: 91.6 mm SL; **ZUMT 3921:** 56.7 mm SL, Palau, 1930's, T. Abe.

Chaetodon wiebeli Kaup, 1863 ツキチヨウチヨウウオ

- ZUMT 62226** (plastic tag of MA-075): 112.9 mm SL, Kii Peninsular, 1970's, donation from Shirahama Aquarium, Kyoto University to M. Aizawa.

Chaetodon xanthurus Bleeker, 1857 アミメチヨウチヨウウオ

- ZUMT 62187** (plastic tag of MA-072): 112.9 mm SL, Kii Peninsular, 1970's, donation from Shirahama Aquarium, Kyoto University to M. Aizawa.

Chaetodon sp.

- ZUMT 42847:** 19.5 mm SL, Hachijo-jima Island, Sept. 1922, M. Uchiyama.
ZUMT 43451: 35.0 mm SL, locality unknown.
ZUMT 43472: 20.5 mm SL; **ZUMT 43473:** 19.0 mm SL, Kochi Pref.

Chelmon rostratus (Linnaeus, 1758) ハシナガチョウチョウウオ

ZUMT 14609: 108.2 mm SL, Philippines.

ZUMT 41030: 100.6 mm SL, Singapore, 12 Mar. 1910, I. Ijima and K. Aoki.

ZUMT 42155: 98.8 mm SL; **ZUMT 42205:** 108.8 mm SL; **ZUMT 42223:** 107.5 mm SL;
ZUMT 42257: 98.1 mm SL, Philippines, 1926, U. Yamamura.

Coradion altivelis McCulloch, 1916 タキゲンロクダイ

ZUMT 23264: 125.7 mm SL, Okino-shima Island, Kochi, T. Kamohara.

ZUMT 40388: 134.5 mm SL, Kagoshima, received in June 1938, K. Ogawa (Women's School, Kagoshima Prefecture).

ZUMT 59858 (Fig. 1): 134.2 mm SL, holotype of *Coradion fulvocinctus* Tanaka, 1918, Tanabe, Wakayama Pref., N. Ui (宇井縫蔵).

Remarks: *C. fulvocinctus* is regarded as a junior synonym of *C. altivelis* (Burgess 1978). Although the dorsal fin of *C. altivelis* is generally accepted as having eight spines, the present specimen has nine spines. Although ZUMT 8317 which collected from Nagasaki Market by I. Kaneko designated as a paratype of this species (Tanaka 1918), this specimen was not found.

ZUMT 62317 (paper tag of P. 4051): 124.5 mm SL; **ZUMT 62318** (paper tag P. 4052): 96.8 mm SL, probably Sarawak, donated in 1960 by Tom Harrisson (Sarawak Museum) to I. Tomiyama.

Remarks: The dorsal fin of the specimen has nine spines.

Coradion chrysozonus (Cuvier, 1831) キスジゲンロクダイ

ZUMT 42156: 104.9 mm SL; **ZUMT 42250:** 115.3 mm SL; **ZUMT 42251:** 95.1 mm SL, Philippines, 1926, U. Yamamura.

Forcipiger flavissimus Jordan & McGregor, 1898 フエヤッコダイ

ZUMT 14249: 114.8 mm SL; **ZUMT 14250:** 107 mm SL; **ZUMT 14251:** 100.2 mm SL;
ZUMT 14252: 134 mm SL, Naha Fish Market, Naha, Okinawa Pref., 2 Feb. 1925, donated by H. Yashiro.

ZUMT 14489: 126.2 mm SL; **ZUMT 38908:** 96.9+ mm SL; **ZUMT 39766:** 114.1 mm SL;
ZUMT 39767: 100.6+ mm SL, probably Okinawa-jima Island, specimens received on Mar. 1925, S. Sakaguchi.

ZUMT 14612: 71.5 mm SL, Philippines.

ZUMT 15096: 120.5 mm SL, Okinawa-jima Island, between 1920 and 1930, S. Sakaguchi (Daiichi Junior High School, Okinawa Prefecture).

ZUMT 40381: 116.5 mm SL, Kagoshima (probably Amami-oshima Island), received in June 1938, K. Ogawa (Women's School, Kagoshima Prefecture).
ZUMT 42224: 95.7 mm SL; **ZUMT 42225**: 75.5 mm SL; **ZUMT 42334**: 109.3 mm SL, Philippines, received in 1926, U. Yamamura.
ZUMT 49729: 77.8 mm SL, Oshima Strait (大島海峡) at Setouchi (瀬戸内), Amami-oshima Island, Mar. 1956.
ZUMT ABE 6041: 92.8 mm SL; **ZUMT ABE 6042**: 109.1 mm SL; **ZUMT ABE 6043**: 103.9 mm SL; **ZUMT ABE 6044**: 103.7 mm SL; **ZUMT ABE 6045**: 95.6 mm SL; **ZUMT ABE 6046**: 98.1 mm SL, Palau, 1930's, T. Abe.

Hemitaurichthys polylepis (Bleeker, 1857) カスミチヨウチヨウウオ

ZUMT 13956: 88.3 mm SL; **ZUMT 15094**: 125.2 mm SL; **ZUMT 15101**: 120.1 mm SL; **ZUMT 15102**: 104.6 mm SL; **ZUMT 15146**: 127.5 mm SL, Okinawa-jima Island, between 1920 and 1930, S. Sakaguchi (Daiichi Junior High School, Okinawa Prefecture).
ZUMT 49727: 87.9 mm SL; **ZUMT 49728**: 82.2 mm SL, Oshima Strait at Setouchi, Amami-oshima Island, Mar. 1956.
ZUMT 52595: 104.8 mm SL, Naha Fish Market, 3 June 1966.
ZUMT 62221 (plastic tag of MA-063): 72.3 mm SL, Kii Peninsular, 1970's, donation from Shirahama Aquarium, Kyoto University to M. Aizawa.

Heniochus acuminatus (Linnaeus 1758) ハタタテダイ

ZUMT 17253: 34.0 mm SL, Unten, Okinawa-jima Island, T. Tanabe.
Remarks: Local name "Fubicha (フウビチャ)".
ZUMT 19679: 75.1 mm SL, Keelung (基隆), Taiwan, H. Sato (佐藤春吉) (Taipei Keelung Junior High School) (台北基隆中学校).
ZUMT 23511: 24.1 mm SL, Susaki, Kochi Pref., 12 Mar. 1931, T. Kamohara (Kochi High School).
ZUMT 26854: 24.1 mm SL; **ZUMT 26855**: 32.0 mm SL, Fukura, Awaji-shima Island, Hyogo Pref., 5 Mar. 1912, R. Uchimura.
Remarks: Local name "Noboritate (ノボリタテ)".
ZUMT 37457: 43.9 mm SL, Pengfu, Taiwan, July 1908.
ZUMT 41961: 39.7 mm SL, Basilan Island, Philippines, U. Yamamura.
ZUMT 42312: 61.4 mm SL, Philippines, 1926, U. Yamamura.
ZUMT 43287: 66.8 mm SL; **ZUMT 43288**: 63.9 mm SL; Fukura, Awaji-shima Island, Hyogo Pref., probably 1912, R. Uchimura.
ZUMT 43302: 52.8 mm SL; Kochi Pref., donation from Jyoto Junior High School, Kochi City (高知市城東中学校).
ZUMT 43356: 32.1 mm SL, Shizuura, Aug. 1922, N. Kuroda.
ZUMT 43382: 26.5 mm SL, Misaki.

Heniochus diphreutes Jordan, 1903 ムレハタタテダイ

- ZUMT 2549:** 37.7 mm SL, Nagasaki, 3 Oct. 1909, Nagasaki Prefecture Normal School (長崎師範学校).
- ZUMT 11725:** 63.6 mm SL; **ZUMT 11726:** 60.0 mm SL, Shimizu Port, Shizuoka Pref., probably 1920's, M. Uchiyama.
- ZUMT 18632:** 35.3 mm SL; Susaki, Kochi Pref., Oct. 1928, T. Kamohara (Kochi High School).
- ZUMT 20515:** 66.2 mm SL; **ZUMT 20516:** 70.3 mm SL; **ZUMT 22042:** 74.8 mm SL, Wakayama Pref.
- ZUMT 22660:** 73.2 mm SL, Kisyu-tanabe, Dec. 1920.
- Remarks: Collector not recorded, but probably Nuizo Ui, who collected and donated many specimens to ZUMT.
- ZUMT 32281:** 37.3 mm SL, Tokyo Market.
- ZUMT 33014:** 81.4 mm SL, Ajiro (網代), Izu, Shizuoka Pref., 7 Dec. 1933, Ajiro Junior High School, Izu (伊豆網代中学校).
- ZUMT 33726:** 35.7 mm SL, Sendai (川内), Kagoshima Pref., T. Ari (有井徳之丞) (Sendai Junior High School, Kagoshima Prefecture).
- ZUMT 39174:** 65.0 mm SL, Estuary at Ukitsu (浮津川尻), Muroto (室戸), Kochi Pref., S. Tanaka?, casting net.
- ZUMT 47064:** 95.0 mm SL, probably Kochi Pref.
- ZUMT 48294:** 71.0 mm SL; **ZUMT 48295:** 64.6 mm SL, near Aburatsubo, Miura, Kanagawa Pref., 1935, T. Abe.
- ZUMT 50687:** 56.5 mm SL, Totoro (土々呂), Nobeoka (延岡), Miyazaki Pref., 10 Sept. 1959, Y. Tominaga.
- ZUMT ABE 62-321:** 30.4 mm SL, locality unknown.

Heniochus varius (Cuvier, 1829) ツノタテダイ

- ZUMT 11256** (cloth tag of 161): 152.1 mm SL, Okinawa-jima Island, between 1920 and 1930, S. Sakaguchi (Daiichi Junior High School, Okinawa Prefecture).
- ZUMT 14582:** 103.7 mm SL, Philippines.
- ZUMT 20508:** 132.1 mm SL, Ryukyu Archipelago, Apr. 1909, S. Watase and H. Kuwano.
- ZUMT 62173** (plastic tag MA-103): 60.3 mm SL, Kii Peninsular, 1970's, donation from Shirahama Aquarium, Kyoto University to M. Aizawa.
- ZUMT 62305:** 40.9 mm SL, Nishidomari, Otsuki, Kochi Pref., summer 2021, Kuroshio Biological Research Foundation.

Roa modesta (Temminck & Schlegel, 1844) ゲンロクダイ

- ZUMT 20527:** 61.9 mm SL; **ZUMT 20745:** 58.0 mm SL; **ZUMT 20746:** 60.2 mm SL, Wakayama, Jan. 1920.

ZUMT 22631: 60.4 mm SL; **ZUMT 22632:** 58.7 mm SL; **ZUMT 22633:** 62.4 mm SL; **ZUMT 22634:** 58.4 mm SL; **ZUMT 22635:** 51.5 mm SL; **ZUMT 22636:** 55.3 mm SL; **ZUMT 22637:** 60.7 mm SL, Kisyu-tanabe, Dec. 1920, probably N. Ui.
ZUMT 25314: 108.8 mm SL, Yamaguchi Pref.
Remarks: Local name “Kagamidai (カガミダイ)”.
ZUMT 26650: 100.6 mm SL, Tokyo Market, 1929.
ZUMT 31237: 91.9 mm SL, Matsue, Shimane Pref., R. Yanai (柳井隆一) (Matsue High School) (松江高校).
ZUMT 36414: 98.6 mm SL, Hayama (葉山), Kanagawa Pref., Aug. 1936, S. Inuo (犬尾三郎).
ZUMT 39173: 54.9 mm SL, Estuary at Ukitsu (浮津川尻), Muroto (室戸), Kochi Pref., S. Tanaka?, cast net.
ZUMT 41193: 109.8 mm SL, bottle labelled Hachijo-jima Island.
ZUMT 41420: 89.1 mm SL, Uozu, Namerikawa, I. Tomiyama.
ZUMT 51044: 90.9 mm SL; **ZUMT 51071:** 88.4 mm SL; **ZUMT 51231:** 81.2 mm SL; **ZUMT 51232:** 88.3 mm SL, East China Sea, Dec. 1959.
ZUMT 51458: 77.0 mm SL, Norin-kaiku 521 (農林 521 区), East China Sea
ZUMT 52232: 91.7 mm SL; **ZUMT 52233:** 87.5 mm SL, Norin-kaiku 319 (農林 319 区), East China Sea, 23 May 1960, R/V No. 31 Tenyomaru (第 31 天洋丸).
ZUMT 52286: 84.9 mm SL, Norin-kaiku 253 and 254 (農林 253 から 254 区), East China Sea, April and May 1960, R/V No. 1 and 2 Shotokumaru (第 1, 2 昭徳丸), bottom trawl.
ZUMT 62228: 18.3 mm SL, 14.1 mm SL, 2 specimens, Jogasaki, Kanagawa Pref., 30 July 1986, H. Masuda (益田 一).
ZUMT 62227 (cloth tag T-47): 110.2 mm SL; **ZUMT 62235:** 87.6 mm SL; **ZUMT 63144:** 85.0 mm SL; **ZUMT 63163:** 13.0 mm SL, locality unknown.
ZUMT ABE 82-1473: 91.2 mm SL; **ZUMT ABE 82-1485:** 85.2 mm SL, Wagu, Mie Pref., 22 Jan. 1985, T. Abe.

Chaetodontidae gen sp.

ZUMT 48472: 21.2 mm SL, Southern Pacific (3°18'S, 171°12'E), 30 Mar. 1956, I. Tomiyama.
ZUMT 48793: 28.7 mm SL; **ZUMT 48787:** 26.7 mm SL; **ZUMT 48792:** 22.9 mm SL, Southern Pacific (1°25'S, 169°15'E), 2 Apr. 1956, I. Tomiyama.
ZUMT 49147: 28.9 mm SL, probably Indian Ocean, received 8 Oct. 1954, M. Shinohara (篠原 勝) (RV Fukuseimaru) (福生丸).

Acknowledgements

We are deeply grateful to the late Y. Tominaga for his dedication and efforts to the ZUMT collection. We are also grateful to H. Hata (National Museum of Nature and Science), I. Abe, S. Fujiwara, A. Inuma, M. Saito, A. Takahashi (Tokyo University of Marine Science and Technology), and H. Ogata (ZUMT) for curatorial assistance. G. S. Hardy (Ngunguru, New Zealand) kindly improved the English in the manuscript. The present study was supported in part by JSPS KAKENHI 21K06313 JP and the Sasakawa Scientific Research Grant from The Japan Science Society (2021-4064) to the first author.

References

- Bouchon-Navaro, Y. 1986. Partitioning of food and space resources by chaetodontid fishes on coral reefs. *Journal of Experimental Marine Biology and Ecology*, 103: 21–40.
- Burgess, W. E. 1978. *Butterflyfishes of the world. A monograph of the family Chaetodontidae* by Dr. Warren E. Burgess. T.F.H. Publications, N.S.W., Australia. 832 pp.
- Hachisuka, M. 2006. *Exploring the South*. Heibon Sha, Tokyo. 481 pp. (In Japanese)
- Hagiwara, K. and Hasegawa, K. 1990. Coastal fishes in Shibazaki, Sagami Bay. *Natural History Report of Kanagawa*, (11): 103–110. (In Japanese)
- Higashihirachi, S. 1962. The late Hirotaka Yashiro and Okinawan insects. *Journal of Okinawa Agriculture*, 1 (2): 55. (In Japanese)
- Hirata, T., Oguri, S., Hirata, S., Fukami, H., Nakamura, Y. and Yamaoka, K. 2011. Seasonal changes in fish assemblages in an area of hermatypic corals in Yokonami, Tosa Bay, Japan. *Japanese Journal of Ichthyology*, 58 (1): 49–64. (In Japanese)
- Koeda, K. 2018. Chaetodontidae. Pp. 302–305. In: Nakabo, T. (ed) *The Natural History of the Fishes of Japan*. Shogakukan, Tokyo. (In Japanese)
- Koeda, K. A specimen of Lined Butterflyfish (Teleostei: Perciformes; Chaetodontidae) collected in 1932 from Fukushima, northern Japan, the northernmost record of the species. *Japan. Japanese Journal of Ichthyology*. DOI: 10.11369/jji.21–032 (In Japanese with English abstract)
- Kuroda, Y. 1927. Birds collected from Basilan Island, the Philippines. *TORI*, 5 (23): 199–261. (In Japanese)
- Nakamura, T. 2003. *Butterflyfishes of the world*. TBS Britannica, Tokyo. 152 pp. (In Japanese)
- Nakamura, Y., Feary, D. A., Kanda, M. and Yamaoka, K., 2013. Tropical fishes dominate temperate reef fish communities within western Japan. *PLOS ONE*, 8 (12): e81107.
- Shimada, K. 2013. Chaetodontidae. Pp. 990–1004, 2022–2025. In: Nakabo, T. (ed) *Fishes of Japan with pictorial keys to the species, third edition*. Tokai University Press, Hadano. (In Japanese)
- Tanaka, S. 1918. Twelve new species of Japanese fishes. *Dobutsugaku Zasshi*, 30 (356): 223–227. (In Japanese)
- Tanaka, S. 1930a. *Figures and descriptions of the fishes of Japan including Riukiu Islands, Bonin Islands, Formosa, Kurile Islands, Korea, and Southern Sakhalin*. Vol. 47: 925–944, pls. 185–187.
- Tanaka, S. 1930b. *Figures and descriptions of the fishes of Japan including Riukiu Islands, Bonin Islands, Formosa, Kurile Islands, Korea, and Southern Sakhalin*. Vol. 48: 945–960, pls. 188–190.
- Tanaka, S., Amemiya, I., Kuroda, N., Ishikawa, S., Nakazawa, K., Taki, I., Uchida, T., Yamada, Y. 1933. *Illustrated Guide to Aquatic Animals and Plants: Useful, Harmful, and Ornamental*. Daichi Shoin, Tokyo. xlvii + 607 pp. (In Japanese)
- Zekeria, Z. A., Weertman, S., Samuel, B., Kale-ab, T. and Videler, J. J. 2006. Growth of *Chaetodon larvatus* (Chaetodontidae: Pisces) in the southern Red Sea. *Marine Biology*, 148: 1113–1122.

Table 1. Comparison between past and present northern most records of family Chaetodontidae based on ZUMT specimens and Shimada (2013), respectively. Records of adults and juveniles are shown separately when differed. Prefecture or Island are abbreviated.

Species	ZUMT (before 1940)		Shimada (2013)	
	Adult	Juvenile	Adult	Juvenile
<i>Chaetodon argentatus</i>	Okinawa	Hachijo	Kanagawa	-
<i>C. auriga</i>	Amami	Chiba	Mie	Iwate
<i>C. auripes</i>	Kanagawa	Chiba	Aomori	-
<i>C. baronessa</i>	Okinawa	-	Wakayama	Chiba
<i>C. bennetti</i>	Okinawa	-	Kanagawa	Chiba
<i>C. citrinellus</i>	Amami	Shizuoka	Chiba	-
<i>C. daedalma</i>	Hachijo	-	Wakayama	-
<i>C. ephippium</i>	Okinawa	Kanagawa	Wakayama	Chiba
<i>C. guentheri</i>	Kochi	-	Shizuoka	Chiba
<i>C. kleinii</i>	Kochi	-	Chiba	-
<i>C. lineolatus</i>	Taiwan*	-	Wakayama	Chiba
<i>C. lunula</i>	Okinawa	Amami	Wakayama	Chiba
<i>C. lunulatus</i>	Amami	-	Kanagawa	Chiba
<i>C. melannotus</i>	Okinawa	-	Kanagawa	Chiba
<i>C. meyeri</i>	Palau	-	Yakushima	-
<i>C. nippon</i>	Kanagawa	-	Chiba	-
<i>C. oligacanthus</i>	Philippines	-	Ogasawara	-
<i>C. ornatissimus</i>	Okinawa	-	Wakayama	-
<i>C. plebeius</i>	Kochi	-	Shizuoka	-
<i>C. punctatofasciatus</i>	Okinawa	-	Wakayama	-
<i>C. selene</i>	Indonesia	-	Kanagawa	-
<i>C. semeion</i>	Palau	-	Okinawa	Wakayama
<i>C. speculum</i>	Taiwan	-	Mie	Kanagawa
<i>C. trifascialis</i>	Amami	-	Wakayama	-
<i>C. unimaculatus</i>	Amami	-	Shizuoka	-
<i>C. vagabundus</i>	Amami	Chiba	Kanagawa	Ibaraki
<i>Chelmon rostratus</i>	Philippines	-	-	Kanagawa
<i>Coradion altivelis</i>	Wakayama	-	Kanagawa	Chiba
<i>Co. chrysozonus</i>	Philippines	-	Kagoshima	-
<i>Forcipiger flavissimus</i>	Amami	-	Hachijo	-
<i>Hemitaurichthys polylepis</i>	Okinawa	-	Shizuoka	-
<i>Heniochus acuminatus</i>	Awaji	Kanagawa	Aomori	-
<i>H. diphreutes</i>	Kanagawa	-	Chiba	-
<i>H. varius</i>	Okinawa	-	Wakayama	Shizuoka
<i>Roa modesta</i>	Kanagawa	-	Ibaraki	Miyagi

*ZUMT 26276, an adult specimen from Onahama, Fukushima Pref., was not included as an exception.

Report on the specimens of families Toxotidae and Drepaneidae (Teleostei: Perciformes) deposited in the Department of Zoology, The University Museum, The University of Tokyo

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Abstract

The collection of Toxotidae and Drepaneidae (Teleostei: Perciformes) deposited in the Department of Zoology, The University Museum, The University of Tokyo (ZUMT) were re-identified in the present study. For Toxotidae, 58 specimens from 31 lots were identified (no types known for this family), including two species, *Toxotes jaculatrix* (Pallas, 1767) and *Toxotes chatareus* (Hamilton, 1822), all collected outside Japan. For Drepaneidae, 15 specimens from 15 lots were identified, including two species, *Drepane longimana* (Bloch & Schneider, 1801) and *Drepane punctata* (Linnaeus, 1758). Although ZUMT 7263 is recognized as a holotype of *Drepane undecimfasciata* Tanaka, 1917, the specimen could not find from the collection.

Introduction

The fish collection of two families Toxotidae and Drepaneidae (Teleostei: Perciformes) which preserved in the Department of Zoology, The University Museum, The University of Tokyo (ZUMT) were re-identified in the present study. The family Toxotidae (archerfishes) is well known for its ability to shoot down insects from overhanging vegetation with a jet water squirted from the mouth (Allen 2004; Senou 2019). This family inhabit in mangrove shores, brackish estuaries, and fresh waters, always in shallow depths (Allen 2001). Archerfishes are sometimes seen in markets and are an important component of artisanal fisheries in many areas, particularly where mangroves are plentiful. A single genus with seven species is recognized as valid, and only a single species, *Toxotes jaculatrix* (Pallas, 1767), have known from Iriomotejima Island in Japanese waters (Allen 2004; Senou 2013).

The family Drepaneidae (Sicklefishes) inhabit usually in sandy or muddy bottoms, and rarely in coral reefs in shallow water, including estuaries and harbors (Heemstra 2001). Mostly caught with bottom trawls and abundantly marketed in southeast Asia. A single genus with three species is recognized as valid, and two species, *Drepane longimana* (Bloch & Schneider, 1801) and *Drepane punctata* (Linnaeus, 1758), have known from southern Japan (Hayashi and Hagiwara 2013; Uejo et al. 2015).

Materials and Methods

The specimens of Toxotidae and Drepaneidae in ZUMT were re-identified in the present study, generally following Allen (2004) for the former and Heemstra (2001) for the latter, and confirmation of at least one diagnostic character. The standard length (SL) of the specimens were measured for all specimens. Species are arranged in alphabetical order by species name. Japanese were given in parentheses for local name, personal name, affiliation name when these written in Japanese in the specimen catalog or tag. The list contains ZUMT number, SL with number of specimens in parentheses when two or more, collection locality, collection date, collector or donator and affiliation, collection method, and remarks when available. No type specimens deposited for Toxotidae in ZUMT.

Collection of Toxotidae in ZUMT

Examination of the specimens of Toxotidae deposited at ZUMT disclosed 58 specimens from 31 lots. No types are known for this family in ZUMT collection. All of the specimens except for a single specimen of *Toxotes chatareus* (Hamilton, 1822) from Australia, are *Toxotes jaculatrix* (Pallas, 1767) which collected from southeastern Asia or Palau.

Collection of Drepaneidae in ZUMT

Examination of the specimens of Drepaneidae deposited at ZUMT disclosed 15 specimens from 15 lots, including two species, *Drepane longimana* (Bloch & Schneider, 1801) and *Drepane punctata* (Linnaeus, 1758). Two specimens of *D. longimana* are collected from East China Sea (Norinkaiku 319), and the remains from Taiwan, China, or Philippines. Although ZUMT 7263 is recognized as a holotype of *Drepane undecimfasciata* Tanaka, 1917, the specimen could not find from the collection.

Toxotidae テッポウウオ科

Toxotes Cloquet, 1816 テッポウウオ属

Toxotes jaculatrix (Pallas, 1767) テッポウウオ

ZUMT 18259: 164.2 mm SL; **ZUMT 18260:** 153.7 mm SL, probably Palau.

Remarks: The specimens labelled as Nan-yo (南洋), generally meaning Micronesian islands.

ZUMT 25510: 87.2 mm SL, Philippines, identified on 12 May 1933, A.W. Herre (Stanford University).

ZUMT 40740: 107.5 mm SL; **ZUMT 40741:** 108.7 mm SL; **ZUMT 41028:** 136.8 mm SL;

ZUMT 41029: 122.1 mm SL, Singapore, 12 Mar. 1910, I. Ijima (飯島 魁) and K. Aoki (青木熊吉).

ZUMT 42001: 29.3 mm SL; **ZUMT 42002:** 40.0 mm SL; **ZUMT 42003:** 48.9 mm SL; **ZUMT 42004:** 59.9 mm SL; **ZUMT 42005:** 62.6 mm SL; **ZUMT 42006:** 61.7 mm SL; **ZUMT 42007:** 58.0 mm SL; **ZUMT 42008:** 47.9 mm SL; **ZUMT 42009:** 26.5 mm SL; **ZUMT 42010:** 58.1 mm SL; **ZUMT 42011:** 63.1 mm SL, Philippines, Jan. 1938, U. Yamamura (山村樞次郎).

Remarks: Although ZUMT 42001 has underbar on the tag, the identification match with ZUMT catalog. Umejiro Yamamura was a palm plantation superintendent on Basilan Island, southern Philippines from May 1925 to April 1926 (Kuroda 1927). He and his family collected and donated a large number of specimens from the area, including fishes, birds, insects, and corals.

ZUMT 55164: 10 specimens, 25.6–83.6 mm SL, Palau, Y. Haneda (羽根田弥太).

ZUMT 62170: 19 specimens, 33.1–144.0 mm SL, Palau, received on Jan. 1938, Y. Haneda.

ZUMT ABE 2748: 98.0 mm SL; **ZUMT ABE 2479:** 160.9 mm SL; **ZUMT ABE 2789:** 41.7 mm SL; **ZUMT ABE 3048:** 157.8 mm SL (dissected); **ZUMT ABE 3383:** 80.0 mm SL; **ZUMT ABE 3384:** 62.5 mm SL; **ZUMT ABE 3385:** 98.9 mm SL; **ZUMT ABE 3395:** 98.9 mm SL; **ZUMT ABE 3906:** 193.7 mm SL; **ZUMT ABE 3958:** 57.2 mm SL, Palau, 1936, T. Abe (阿部宗明).

Toxotes chatareus (Hamilton, 1822)

ZUMT 62172 (metallic tag of 2815): 93.1 mm SL, probably Australia.

Drepanidae スダレダイ科

Drepane Cuvier, 1831 スダレダイ属

Drepane longimana (Bloch & Schneider, 1801) スダレダイ

Remarks: *Drepane undecimfasciata* Tanaka, 1917 was described as a new species with the Japanese name “Sudaredai (スダレダイ)” on the basis of the holotype (133 mm total length) which collected from Nagasaki Market (長崎市場) by Ichiro Kaneko (金子一狼). The description of the species, e.g., having 10 vertical stripes on body lateral (Tanaka 1917), well match with the characteristic of *D. longimana*, and probably the junior synonym of the latter. Although the information in the specimen ledger revealed that ZUMT 7263 corresponds to the holotype, we were unable to find this specimen in the collection.

ZUMT 52229: 125.5 mm SL; **ZUMT 52260:** 111.6 mm SL, Norin-kaiku 319 (農林 319 区), East China Sea, 23 May 1960, R/V No. 31 *Tenyomaru* (第 31 天洋丸).

ZUMT 62331 (cloth tag of T-48): 169.3 mm SL, locality unknown.

ZUMT 62332: 153.6 mm SL, Nishimon-machi Market (西門町市場), Taipei, Taiwan, 21 Feb. 1927.

ZUMT 62333: 117.0 mm SL, Chitose-machi Market (千歳町市場), Taipei (台北), Taiwan, 1931.

ZUMT 62334 (cloth tag of 114): 145.0 mm SL, Chitose-machi Market, Taipei, Taiwan, 22 Nov. 1930.

Drepane punctata (Linnaeus, 1758) ユウダチスダレダイ

ZUMT 40527: 77.0 mm SL, Hainan Island (海南島), Kanton (広東省), Shin (清), Oct. 1906, I. Katsuge (勝毛市五郎).

ZUMT 40845: 83.5 mm SL, Manila, Philippines, 11 Feb. 1909, I. Ijima and K. Aoki.
ZUMT 42161: 91.1 mm SL; **ZUMT 42162:** 117.1 mm SL; **ZUMT 42309:** 112.6 mm SL,
Philippines, 1926, U. Yamamura.
ZUMT 42320: 87.6 mm SL; **ZUMT 42322:** 98.5 mm SL; **ZUMT 42373:** 90.0 mm SL, Basilan,
Philippines, 1926, U. Yamamura.
ZUMT 62626: 78.0 mm SL, locality unknown.

Acknowledgements

We are deeply grateful to the late Y. Tominaga for his dedication and efforts to the ZUMT collection. We are also grateful to H. Hata (National Museum of Nature and Science), I. Abe, S. Fujiwara, A. Inuma, M. Saito, A. Takahashi (Tokyo University of Marine Science and Technology), and H. Ogata (ZUMT) for curatorial assistance. The present study was supported in part by JSPS KAKENHI 21K06313 JP and the Sasakawa Scientific Research Grant from The Japan Science Society (2021-4064) for the first author.

References

- Allen, G. R. 2001. Toxotidae, Archerfishes. Pp. 3212–3214. In: Carpenter, K. E. and Niem, V. H. (eds) FAO species identification guide for fishery purposes. The living marine resources of the western central Pacific, vol. 5. Bony fishes part 3 (Menidae to Pomacentridae). FAO, Rome.
- Allen, G. R. 2004. *Toxotes kimberleyensis*, a new species of Archerfish (Pisces: Toxotidae) from fresh waters of Western Australia. Records of the Australian Museum (2004), 56: 225–230.
- Hayashi, K. and Hagiwara, K. 2013. Drepanidae. Pp. 989, 2022. In: Nakabo, T. (ed) Fishes of Japan with pictorial keys to the species, 3rd edition. Tokai University Press, Hadano. (In Japanese)
- Heemstra, P. C. 2001. Drepanidae, Sicklefishes. Pp. 3221–3223. In: Carpenter, K. E. and Niem, V. H. (eds) FAO species identification guide for fishery purposes. The living marine resources of the western central Pacific, vol. 5. Bony fishes part 3 (Menidae to Pomacentridae). FAO, Rome.
- Kuroda, Y. 1927. Birds collected from Basilan Island, the Philippines. TORI, 5 (23): 199–261.
- Senou, H. 2013. Toxotidae. Pp. 988, 2021. In: Nakabo, T. (ed) Fishes of Japan with pictorial keys to the species, 3rd edn. Tokai University Press, Hadano. (In Japanese)
- Senou, H. 2019. Toxotidae. P. 301. In: Nakabo, T. (ed) The natural history of the fishes of Japan. Shogakukan, Tokyo.
- Tanaka, S. 1917. Eleven new species of fish from Japan. Dobutsugaku Zasshi, 29 (339): 7–12.
- Uejo, T., Itou, M. and Motomura, H. 2015. First reliable records of *Drepane punctata* (Perciformes: Drepaneidae) from Japan. Nature of Kagoshima, 41: 145–147.

List of specimens of the families Echeineidae and Rachycentridae (Actinopterygii: Teleostei: Perciformes) deposited in the Department of Zoology, The University Museum, The University of Tokyo

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Abstract

A list of specimens of Echeineidae and Rachycentridae deposited in the Department of Zoology, The University Museum, The University of Tokyo is provided. 192 echeineid and 10 rachycentrid specimens including the holotype of *Echeneis nubifera* Tanaka, 1915 represented by all known echeineid species, except for *Echeneis naucratoides* Zuiew, 1789, and *Rachycentris canadum* (Linnaeus, 1766), the sole extant species of Rachycentridae, are found.

Introduction

The sharksuckers or discfishes included in the family Echeineidae are currently regarded as comprising eight species in three genera (Strasburg 1964; Lachner 1973, 1986; Collette 2002a; Gray et al. 2009). All are characterized by a singular life strategy, attaching themselves via a sucking disc on the head to various marine vertebrates, including sharks, manta rays, swordfishes, sea turtles, dolphins, and whales (Strasburg 1964; Kishida 1997; Collette 1999a; Hata et al. 2018; Hata 2020a, c; Hata and Koeda 2021). They have also been observed attached to artificial objects, such as long-line fishing floats (Morota and Fujita 1995). Although echeineids are mainly distributed in warm marine waters, they occasionally occur in rivers or high-latitude waters (such as Okhotsk Sea or off Canada), together with their hosts (Storer 1839; Hart 1973; Ogimoto et al. 2014; Kyne 2015).

The family Rachycentridae comprises the single extant species *Rachycentron canadum* (Linnaeus, 1766), in addition to the fossil species *Rachycentron stremphaenkus* Godfrey and Carnevale, 2020, described from a late Miocene (Tortonian) fossil in the St. Marys Formation, Maryland State, U.S. (Collette 1999b; Godfrey and Carnevale 2020). The family has been frequently treated as a member of Carangiformes in recent years, and believed to be related to Echeineidae (both families included in the superfamily Echeineioidea) (O'Toole 2002; Girard et al. 2020). Although similar to some echeineid species in overall body shape and coloration, *R. canadum* clearly differs from the latter in having the first dorsal fin comprising isolated fin spines (not connected by membrane) instead of a sucking disc (Collette 1999a, b, 2002a, b,

2016a, b). Although *R. canadum* does not attach itself to other organisms, the species frequently associates with large vertebrates, such as large-bodied rays and groupers (Takamatsu 1967; Smith and Merriner 1982; Sasaki 1997; Félix and Hackradt 2008). It is widely distributed in warm parts of the Indo-West Pacific and Atlantic oceans, where it attains up to 2 m in total length, and is fished and aquacultured in warm regions, including Japan (Collette 1999b, 2002b, 2016b; Xan 2005; Koeda 2019; Hata 2020b).

During a survey of the fish collection deposited in the Department of Zoology, The University Museum, The University of Tokyo (ZUMT), specimens of Echeineidae and Rachycentridae collected from various areas, including the holotype of *Echeneis nubifera* Tanaka, 1915, were found. A list of these ZUMT specimens is given below.

Materials and Methods

Specimens of Echeineidae and Rachycentridae in the Department of Zoology, The University Museum, The University of Tokyo (abbreviated as ZUMT) were identified during the present study, following Strasburg (1964), Collette (1999a, 2002a, 2016a) and Hatooka and Kai (2013), and Collette (1999b) and Senou (2013), respectively. The classification of genera and subfamilies of the family Echeineidae followed Gray et al. (2009). Species are arranged in alphabetical order by species name. Each specimen-lot contains a single specimen. Parentheses following registration numbers include [standard length (in mm); counts of laminae on the head sucking disc (not applicable to Rachycentridae); collection locality; collection date; collector; remarks]. Collection data of specimens are omitted when matching that of immediately following specimens. The ZUMT specimens listed herein were primarily stored in Room 406 (specimen storage room), with additional specimens in Room 407 (including types and S. Tanaka specimens), in the museum building. Most were stored in containers on shelves, although 12 larger echeineid specimens [ZUMT 48593 (*Remora osteochir*), ZUMT 48596, 52028 (*Remora remora*), ZUMT ABE 2787, 3748, 10091, 10452, ZUMT 41235, 49076 50997, 50998, and 51471 (*Echeneis naucrates*)], and all rachycentrid specimens were stored in Room 406 (as of Nov. 2021) in a glass tank (labelled “Echeineidae 313-A” and “Rachycentridae”, respectively), with the glass lid sealed with a silicon adhesive. Although some of the ZUMT specimens, collected by Dr. Tokiharu Abe, had not been registered into the ZUMT collection, with the collection data of most missing, they are listed herein together with their ZUMT ABE number (number written on the label), in the hope that Dr. Abe’s catalog books with collection data will be rediscovered in the future.

Results

Examples of all known echeineid species (except *Echeneis naucratoides* Zuiew, 1789, endemic to the western Atlantic; Collette 2002a), comprising 192 specimens, were confirmed in the ZUMT collection. In addition, ten examples of *Rachycentron canadum* from Japan and the East China Sea were found. Counts of disc laminae of the ZUMT specimens of each echeineid species (shown in Table 1) generally closely matched counts in Strasburg (1964), Collette (2002a, 2016a), and Hatooka and Kai (2013), although a single specimen of *Remora australis* had 29 laminae [24–28 in Collette (2002a, 2016a) and Hatooka and Kai (2013)]. Four specimens figured in Tanaka (1914a, b, 1915a, b, 1916: series of “Figures and descriptions of

the fishes of Japan including Riukiu Islands, Bonin Islands, Formosa, Kurile Islands, Korea and southern Sakhalin”), on two of which were based the standard Japanese names “Suji-Koban” and “Abura-koban, plus the holotype of *Echeneis nubifera* Tanaka, 1915, were found. However, examples of *E. naucrates* and *R. osteochir*, included in Tanaka (1916), were not found (see Remarks following each species).

Species accounts

Family Echeneidae Subfamily Echeneinae

Echeneis naucrates Linnaeus, 1758 コバンザメ (Fig. 1A)

JAPAN

ZUMT 2458 (131.4 mm SL; disc laminae 24; Nagasaki Pref.; Aug. 1909)

ZUMT 5464 (92.1 mm SL; 24; Izuhara, Tsushima City, Tsushima Island, Nagasaki Pref.; 29 Sept. 1903; coll. by S. Watase and S. Yasuda)

ZUMT 13309 (235.2 mm SL; 23; Nyumaizaki, Fukaura Town, Aomori Pref.; coll. by S. Tanabe)

ZUMT 25662 (112.3 mm SL; 23; probably Toyama Pref.; donated from Toyama Prefectural Fisheries Training Center)

ZUMT 26053 (96.6 mm SL; 23; Toyama Pref.; 22 July 1933; coll. by K. Kikuchi)

ZUMT 41235 (321.0 mm SL; 24; Uozu or Namerikawa City, Toyama Pref.; coll. by I. Tomiyama)

ZUMT 41659 (217.0 mm SL; 24; Ogasawara Islands)

EAST CHINA SEA

ZUMT 50997 (520.0 mm SL; 24), ZUMT 50998 (521.0 mm SL; 26; East China Sea; Sept. 1959)

ZUMT 51471 (625.0 mm SL; 23; East China Sea)

PALAU

ZUMT 31710 [77.6 mm SL; 24; probably Palau; labelled as「南洋」(“nan-yo”, general term for Micronesian Islands)]

ZUMT ABE 2787 (550.0 mm SL; 24), ZUMT ABE 3748 (523.0 mm SL; 23; Palau)

INDONESIA

ZUMT 49076 [485.6 mm SL; 23; Fordate Island, Moluccas (7°00'N, 132°00'E)]

ZUMT 49086 (224.5 mm SL; 23; Fordate Island, Moluccas; 31 Jan. 1955; coll. by Z. Maekawa and S. Suzuki)

INDIAN OCEAN

ZUMT 49030 [113.7 mm SL; 26; Indian Ocean (3°55'00"N, 90°49'00"E; approx. 500 km west of northern tip of Sumatra, Indonesia); by 17 Apr. 1957; coll. by Z. Maekawa and S. Suzuki]

LOCALITY UNKNOWN

ZUMT ABE 9071 (139.8 mm SL; 24), ZUMT ABE 10091 (367.7 mm SL; 25), ZUMT ABE 10452 (448.0 mm SL; 26), ZUMT ABE 10458 (248.6 mm SL; 24; no data)

Remarks. Tanaka (1916) reported this species as *Leptoecheneis naucrates*, based on ZUMT 4308 (33.5 cm total length), collected from Misaki, Kanagawa Pref., Japan. However, that specimen was not found during this investigation.

Phtheichthys lineatus (Menzies, 1791) スジコバン

(Fig. 1B)

JAPAN

ZUMT 5463 [56.8 mm SL; disc laminae 10; Koajiro, Miura City, Kanagawa Pref.; 11 Aug. 1903; coll. by K. Aoki; attached to *Chilomycterus reticulatus* (Linnaeus, 1758)]

ZUMT 22542 (64.1 mm SL; 11; Tanabe City, Wakayama Pref.; Jan. 1920; coll. by N. Ui)

ZUMT 54381 (177.6 mm SL; 10; Matsuwa, Miura City, Kanagawa Pref.)

KIRIBATI

ZUMT 48754 (49.9 mm SL; 10), ZUMT 48800 [45.1 mm SL; 9; approx. 70 km southwest of Banaba (1°25'S, 169°15'E); 2 Apr. 1956; coll. by Z. Maekawa and S. Suzuki]

INDONESIA

ZUMT 48931 (48.2 mm SL; 9), ZUMT 48932 (50.4 mm SL; 10; Banda Sea, Molu Island; Jan. 1956; coll. by Z. Maekawa and S. Suzuki)

Remarks. Tanaka (1914a) gave a detailed description and illustration of ZUMT 54381, being the first record of the species from Japanese waters, as well as proposing the new Japanese name “Suji-koban” for the species.

Subfamily Remorinae

Remora albescens (Temminck & Schlegel, 1850) シロコバン

(Fig. 1C)

JAPAN

ZUMT 4326 (131.0 mm SL; disc laminae 12; obtained at Tokyo Market)

ZUMT 23222 (131.8 mm SL; 13; Toyama Bay, Toyama Pref.; coll. by K. Kikuchi)

ZUMT 24224 (79.0 mm SL; 13), ZUMT 24226 [50.5 mm SL; 13; probably collected from Niigata Pref.; coll. by Y. Hiramatsu (Niigata Prefectural Takada Normal School)]

ZUMT 41292 (190.1 mm SL; 13; Uozu or Namerikawa City, Toyama Pref.; coll. by I. Tomiyama)

ZUMT 54383 (130.0 mm SL; 12; Matsuwa, Miura City, Kanagawa Pref.)

ZUMT 62278 (37.9 mm SL; 12; Misaki, Miura City, Kanagawa Pref.; Oct. 1898)

EAST CHINA SEA

ZUMT 52026 (191.1 mm SL; 13), ZUMT 52027 (224.3 mm SL; 14; East China Sea; July, 1960)

LOCALITY UNKNOWN

ZUMT 4210 (70.0 mm SL; 12; no data)

Remarks. Tanaka (1915a) gave a detailed description and illustration of ZUMT 54383 as *Echeneis clypeata* Günther, 1860, and proposed the new Japanese name “Abura-koban”. The nominal species is currently regarded as a junior synonym of *R. albescens* (Matsubara 1955; Kamohara 1958, 1964; Lachner 1973, 1986; Lachner and Post 1990).

Remora australis (Bennett, 1840) オオコバン

(Fig. 1D)

JAPAN

ZUMT 16289 (69.5 mm SL; disc laminae 27), ZUMT 16290 (77.0 mm SL; 29; Kinkasan Island, Ishinomaki City, Miyagi Pref.; Aug. 1925; donated from S. Goto; attached to *Balaenoptera borealis* Lesson, 1828)

ZUMT 38040 (192.3 mm SL; 26; probably Japan)

LOCALITY UNKNOWN

ZUMT 62135 (117.3 mm SL; 26), ZUMT 62136 (156.0 mm SL; 27; no data).

Remarks. Hata and Koeda (2021) reported ZUMT 16289 and 16290 as the first records of *R. australis* from Miyagi Pref., Japan.

Remora brachyptera (Lowe, 1839) クロコバン

(Fig. 1E)

JAPAN

ZUMT 5465 (106.2 mm SL; disc laminae 18), ZUMT 62277 (94.7 mm SL; 15; Izuhara, Tsushima City, Tsushima Island, Nagasaki Pref.; 14 Sept. 1903; coll. by S. Watase and S. Yasuda)

ZUMT 5669 (144.9 mm SL; 16; Izuhara, Tsushima City, Tsushima Island, Nagasaki Pref.; 27 Sept. 1903; coll. by S. Watase and S. Yasuda)

ZUMT 7271 (139.9 mm SL; 16; Nagasaki Pref.; coll. by I. Kaneko)

ZUMT 13039 (165.1 mm SL; 17; Miyako Bay, Iwate Pref.; coll. by S. Tanabe)

ZUMT 25856 (1, 125.5 mm SL; 16; Toyama Pref.; 22 July 1933; coll. by K. Kikuchi)

ZUMT 26287 (200.6 mm SL; 16; Onahama, Iwaki City, Fukushima Pref.)

ZUMT 32568 (144.4 mm SL; 16; Misaki, Miura City, Kanagawa Pref.)

ZUMT 32828 (96.3 mm SL; 16; probably obtained at Tokyo Fish Market)

ZUMT 41440 (138.3 mm SL; 16; Uozu or Namerikawa City, Toyama Pref.; coll. by I. Tomiyama)

ZUMT 43402 (132.1 mm SL; 16), ZUMT 43403 (106.4 mm SL; 16), ZUMT 43404 (89.4 mm SL; 16; obtained at Tokyo Fish Market, donated from Yamakoshi Specimen Shop)

ZUMT 45717 (113.4 mm SL; 16; Uozu or Namerikawa City, Toyama Pref.; coll. by I. Tomiyama)

ZUMT 50011 (133.2 mm SL; 16), ZUMT 50199 [118.7 mm SL; 18; Arikawa, Shinkamigoto Town (Nakadori-jima Island, Goto Islands), Nagasaki Pref.; 18 Oct. 1953; coll. by I. Tomiyama]

ZUMT 54382 (151.4 mm SL; 17), ZUMT 54385 (171.3 mm SL; 16; Matsuwa, Miura City, Kanagawa Pref.)

ZUMT 62131 (124.9 mm SL; 17), ZUMT 62132 (137.2 mm SL; 17), ZUMT 62133 (133.2 mm SL; 16), ZUMT 62160 [156.4 mm SL; 16; Satsunan Area (water area from the mainland of Kagoshima Pref. to Tokara Islands), Kagoshima Pref.; 1949]

ZUMT 62169 [106.5 mm SL; 16; Lot's Wife (Sofu-gan Rock), Zunan Islands; 6 July 1927; attached to ventral surface of *Prionace glauca* (Linnaeus, 1758)]

TAIWAN

ZUMT 12378 (101.0 mm SL; 16; Orchid Island; coll. by T. Aoki)

ZUMT 19027 (151.1 mm SL; 16; Taipei City; coll. by H. Sato)

INDONESIA

ZUMT 48343 (102.9 mm SL; 16; Banda Sea; 18 Feb. 1953)

ZUMT 48705 [64.1 mm SL; 16; Banda Sea (5°57'S, 128°59'E); 20 Jan. 1956; coll. by Z. Maekawa and S. Suzuki]

ZUMT 48723 (109.4 mm SL; 17), ZUMT 48724 (106.6 mm SL; 16; Molu Island, Moluccas; 29 Jan. 1956; coll. by Z. Maekawa and S. Suzuki)

ZUMT 48933 (47.8 mm SL; 18), ZUMT 48934 (31.8 mm SL; 18; Molu Island, Moluccas; Jan. 1956; coll. by Z. Maekawa and S. Suzuki)

KIRIBATI

ZUMT 48767 [99.6 mm SL; 15; approx. 70 km southwest of Banaba (1°16'S, 169°14'E); 3 Apr. 1956; coll. by Z. Maekawa and S. Suzuki]

LINE ISLANDS

ZUMT 48986 [108.1 mm SL; 16; approx. 130 km northwest of Jarvis Island (0°37'N, 160°45'W); 26 Oct. 1956; coll. by Z. Maekawa and S. Suzuki]

INDIAN OCEAN

ZUMT 49054 [135.7 mm SL; 16; eastern Indian Ocean (9°15'S, 88°01'E; approx. 1000 km northwest of Cocos-Keeling Islands); 23 Feb. 1955; obtained from stomach of *Xiphias gladius* Linnaeus, 1758]

LOCALITY UNKNOWN

ZUMT 39362 (140.9 mm SL; 16), ZUMT 39363 (119.4 mm SL; 17), ZUMT 62118 (213.4 mm SL; 16), ZUMT 62119 (127.5 mm SL; 18), ZUMT 62120 (167.2 mm SL; 16), ZUMT 62121 (125.0 mm SL; 16), ZUMT 62122 (155.9 mm SL; 16), ZUMT 62123 (154.3 mm SL; 17), ZUMT 62124 (133.3 mm SL; 16), ZUMT 62125 (108.8 mm SL; 17), ZUMT 62126 (122.9 mm SL; 16), ZUMT 62127 (147.7 mm SL; 16), ZUMT 62128 (141.8 mm SL; 15), ZUMT 62129 (136.7 mm SL; 17), ZUMT 62130 (132.6 mm SL; 16), ZUMT 62138 (156.5 mm SL; 16), ZUMT 62152 (148.4 mm SL; 16), ZUMT 62153 (122.2 mm SL; 17), ZUMT 62154 (80.3 mm SL; 16), ZUMT 62155 (81.3 mm SL; 16), ZUMT 62156 (177.7 mm SL; 17), ZUMT 62157 (165.6 mm SL; 17), ZUMT 62158 (156.4 mm SL; 16), ZUMT 62161 (168.8 mm SL; 16), ZUMT 62167 (157.1 mm SL; 17), ZUMT 62168 (181.1 mm SL; 16), ZUMT ABE 8140 (154.3 mm SL; 18), ZUMT ABE 9791 (143.3 mm SL; 16), ZUMT ABE 9837 (94.1 mm SL; 16), ZUMT ABE 9838 (156.0 mm SL; 15), ZUMT ABE 10087 (140.1 mm SL; 18), ZUMT ABE 10513 (167.0 mm SL; 16), ZUMT ABE 59-514 (182.8 mm SL; 17), ZUMT ABE 55-18 (88.1 mm SL; 17), ZUMT ABE 60-310 (135.3 mm SL; 16), ZUMT ABE 60-980 (95.7 mm SL; 17; no data)

Remarks. Although ZUMT 54382 was shown as *Echeneis remora* by Tanaka (1914b), the specimen is re-identified as *R. brachyptera* in this study. Subsequently, Tanaka (1915b) gave a detailed description and illustration of ZUMT 54385 as *Echeneis brachyptera*.

***Remora osteochir* (Cuvier, 1829) ヒシコバン**

(Fig. 1F)

JAPAN

ZUMT 18619 (96.0 mm SL; disc laminae 18; Kashiwa-jima Island, Otsuki Town, Kochi Pref.; Aug. 1928; coll. by T. Kamohara)

ZUMT 24225 [83.6 mm SL; 18; probably collected from Niigata Pref.; coll. by Y. Hiramatsu (Niigata Prefectural Takada Normal School)]

ZUMT 26052 (61.5 mm SL; 18; Toyama Pref.; 22 July 1933; coll. by K. Kikuchi,)

ZUMT 38643 (266.7 mm SL; 18; Katsuura City, Chiba Pref.)

ZUMT 59498 (150.8 mm SL; 20), ZUMT 59499 (186.3 mm SL; 18; Japan; 27 Dec. 1989)

ZUMT 62137 [180.1 mm SL; 18; Satsunan Area (water area from the mainland of Kagoshima Pref. to Tokara Islands), Kagoshima Pref.; 1949]

TAIWAN

ZUMT 12379 (106.4 mm SL; 19), ZUMT 12380 (79.3 mm SL; 18; Orchid Island; coll. by T. Aoki)

INDONESIA

ZUMT 48714 (67.0 mm SL; 18; approx. 30 km northwest of Nila Island (6°33'S, 129°16'E); 22 Jan. 1956; coll. by Z. Maekawa and S. Suzuki)

ZUMT 48737 [72.0 mm SL; 19; approx. 50 km north of Molu Island (6°15'S, 131°24'E); 29 Jan. 1956]

INDIAN OCEAN

ZUMT 49072 [251.4 mm SL; 18; eastern Indian Ocean (10°09'S, 90°52'E; approx. 700 km northwest of Cocos-Keeling Islands)]

LOCALITY UNKNOWN

ZUMT 4286 (86.9 mm SL; 17), ZUMT 8245 (55.8 mm SL; 18), ZUMT 39361 (104.3 mm SL; 18), ZUMT 62151 (79.1 mm SL; 18), ZUMT ABE 61-913 (102.4 mm SL; 19), ZUMT ABE 61-914 (82.2 mm SL; 19), ZUMT ABE 61-915 (101.4 mm SL; 18), ZUMT ABE 61-916 (83.5 mm SL; 18; no data)

ZUMT 48593 (343.4 mm SL; 19; precise locality unknown; 3 Apr. 1956; coll. by Z. Maekawa and S. Suzuki)

ZUMT 62139 (279.7 mm SL; 19; locality unknown; 27 Feb. to 7 Mar. 1950)

Remarks. Tanaka (1916) reported *Rhombochirus megalodiscus* (Franz, 1910) [currently regarded as a junior synonym of *R. osteochir* (Lachner 1973, 1986; Lachner and Post 1990)] based on ZUMT 4211 (29.5 cm total length), collected from Misaki, Kanagawa Pref., Japan. However, the specimen was not found during this investigation.

***Remora remora* (Linnaeus, 1758) ナガコバン**

(Fig. 1G)

JAPAN

ZUMT 17834 (109.6 mm SL; 18), ZUMT 17835 (83.2 mm SL; 18), ZUMT 17836 (108.7 mm SL; 17), ZUMT 17837 (88.7 mm SL; 18), ZUMT 17838 [85.0 mm SL; 17; off Muroran City, Hokkaido; Oct. 1926; coll. by S. Katsuki; attached to *Prionace glauca*]

ZUMT 18288 (150.5 mm SL; 17; Kamaishi City, Iwate Pref.; 5 Sept. 1927; coll. by G. Toba)
ZUMT 19989 (145.8 mm SL; 18), ZUMT 26951 (111.0 mm SL; 18; Kagoshima Pref.)
ZUMT 21128 (48.5 mm SL; 18; obtained at Tokyo Fish Market)
ZUMT 25857 (89.5 mm SL; 17; Toyama Pref.; 22 July 1933; coll. by K. Kikuchi)
ZUMT 32525 (86.4 mm SL; 18; Misaki, Miura City, Kanagawa Pref.)
ZUMT 33383 (77.0 mm SL; 17; Shizuoka Pref.)
ZUMT 34066 [76.1 mm SL; 17; probably collected from Fukushima Pref.; donated from H. Kakuda (Onahama, Iwaki City, Fukushima Pref.)]
ZUMT 37675 (107.3 mm SL; 18; Onahama, Iwaki City, Fukushima Pref.)
ZUMT 43393 [169.7 mm SL; 17; probably collected from Miyazaki Pref.; donated from S. Nakajima (Miyazaki Agriculture and Forestry Higher School)]
ZUMT 43401 (84.9 mm SL; 17; obtained at Tokyo Fish Market; donated from Yamakoshi Specimen Shop)
ZUMT 44404 (130.9 mm SL; 17; Oshima, Kominato, Chiba Pref.)
ZUMT 47705 (155.5 mm SL; 18; Okinawa-jima Island, Okinawa Pref.; July 1936; coll. by S. Inuo)
ZUMT 48342 (174.8 mm SL; 18; obtained at Tokyo Fish Market; Nov. 1952)
ZUMT 54384 (121.3 mm SL; 18; Matsuwa, Miura City, Kanagawa Pref., holotype of *Echeneis nubifera* Tanaka, 1915)
ZUMT 62134 (122.3 mm SL; 17), ZUMT 62159 [161.5 mm SL; 18; Satsunan Area (water area from the mainland of Kagoshima Pref. to Tokara Islands), Kagoshima Pref.; 1949]
ZUMT 62234 (101.3 mm SL; 18; Matsuwa, Miura City, Kanagawa Pref.)

EAST CHINA SEA

ZUMT 52028 (434.9 mm SL; 18; East China Sea; July 1960)

INDONESIA

ZUMT 48344 (72.4 mm SL; 18; Banda Sea; 18 Feb. 1953)
ZUMT 48713 [78.3 mm SL; 17; northwest of Nila Island (6°33'S, 129°16'E); 22 Jan. 1956; coll. by Z. Maekawa and S. Suzuki]
ZUMT 48935 (27.3 mm SL; 19; Banda Sea, Molu Island; Jan. 1956; coll. by Z. Maekawa and S. Suzuki)

WESTERN PACIFIC

ZUMT 48773 [83.8 mm SL; 17; Western Pacific (3°09'S, 171°07'E; approx. 300 km southeast of Banaba, Kiribati); 30 Mar. 1956; coll. by Z. Maekawa and S. Suzuki]

INDIAN OCEAN

ZUMT 49053 [167.4 mm SL; 17; eastern Indian Ocean (9°15'S, 88°01'E; approx. 1000 km northwest of Cocos-Keeling Islands); 23 Feb. 1955; obtained from stomach of *Xiphias gladius*]

LOCALITY UNKNOWN

ZUMT 4306 (60.8 mm SL; 18), ZUMT 39360 (108.8 mm SL; 18), ZUMT 62116 (126.3 mm SL; 18), ZUMT 62117 (102.4 mm SL; 17), ZUMT 62140 (67.7 mm SL; 17), ZUMT 62141 (68.3 mm SL; 18), ZUMT 62142 (64.5 mm SL; 18), ZUMT 62143 (79.6 mm SL; 17), ZUMT 62144 (64.3 mm SL; 17), ZUMT 62145 (61.5 mm SL; 18), ZUMT 62146 (87.7 mm SL; 18), ZUMT 62147 (65.2 mm SL; 18), ZUMT 62148 (68.6 mm SL; 18), ZUMT 62149 (66.2 mm

SL; 18), ZUMT 62150 (145.7 mm SL; 17), ZUMT 62162 (172.2 mm SL; 17), ZUMT 62163 (180.2 mm SL; 17), ZUMT 62164 (169.0 mm SL; 17), ZUMT 62165 (182.4 mm SL; 17), ZUMT 62166 (194.3 mm SL; 18), ZUMT ABE 8641 (105.1 mm SL; 17), ZUMT ABE 9789 (127.0 mm SL; 18), ZUMT ABE 9833 (91.6 mm SL; 17), ZUMT ABE 9834 (109.3 mm SL; 18), ZUMT ABE 9835 (100.2 mm SL; 18), ZUMT ABE 9836 (101.9 mm SL; 18), ZUMT ABE 10674 (126.3 mm SL; 18), ZUMT ABE 55-25 (107.2 mm SL; 18), ZUMT ABE 55-62 (149.7 mm SL; 17), ZUMT ABE 55-63 (91.8 mm SL; 18; no data)
ZUMT 48596 (319.3 mm SL; 18; precise locality unknown; 18 Apr. 1956; coll. by Z. Maekawa and S. Suzuki)

Remarks. ZUMT 54384 was designated as the holotype of *Echeneis nubifera* by Tanaka (1915b) in his original description of the species, for which he proposed the Japanese name “Kumo-koban”. Currently, *E. nubifera* is regarded as a junior synonym of *R. remora* (Matsubara 1955; Lachner 1973; Lachner and Post 1990; Parenti 2021).

Family Rachycentridae

Rachycentron canadum (Linnaeus, 1766) スギ

JAPAN: ZUMT 31505 [286.2 mm SL+, anterior part of body only; probably collected from Shimane Pref.; donated from R. Yanai (Matsue High School)]

ZUMT 50026 [327.6 mm SL; Miiraku, Goto City (Fukue-jima Island, Goto Islands), Nagasaki Pref.; 13 Oct. 1953; coll. by I. Tomiyama]

ZUMT 50423 (319.8 mm SL; Ichibu, Ikitsuki-shima Island, Hirado City, Nagasaki Pref.; 26 Oct. 1953; coll. by I. Tomiyama)

EAST CHINA SEA

ZUMT 51420 (267.4 mm SL), ZUMT 51470 (362.8 mm SL; East China Sea)

LOCALITY UNKNOWN

ZUMT 62263 (503.9 mm SL), ZUMT 62728 (327.1 mm SL), ZUMT 62729 (403.7 mm SL), ZUMT 62731 (315.2 mm SL), ZUMT 62732 (330.9 mm SL; no data)

Acknowledgements

We are deeply grateful to the late Y. Tominaga for his dedication and efforts to the ZUMT collection. We also thank I. Abe, S. Fujiwara, A. Inuma, M. Saito, A. Takahashi (Tokyo University of Marine Science and Technology), H. Ogata and other volunteers for the opportunity to examine the present specimens and curatorial assistance, and also G. Hardy (Ngunguru, New Zealand), who read the manuscript and provided help with English. This study was supported in part by the Sasakawa Scientific Research Grant from the Japan Science Society (28-745, 2021-4064); a Grant-in-Aid from the Japan Society for the Promotion of Science for JSPS Fellows (DC2: 29-6652); JSPS KAKENHI Grant Numbers 19K23691 and 21K06313JP.

References

- Collette, B. B. 1999a. Echeneidae, remoras (sharksucker, discfishes). Pp. 2652–2654. In: Carpenter, K. E. and Niem, V. H. (eds), FAO species identification guide for fishery purposes. The living marine resources of the western central Pacific. Vol. 3. Batoid fishes, chimaeras and bony fishes part 2 (Mugilidae to Carangidae). FAO, Rome.
- Collette, B. B. 1999b. Rachycentridae, cobia. P. 2655. In: Carpenter, K. E. and Niem, V. H. (eds), FAO species identification guide for fishery purposes. The living marine resources of the western central Pacific. Vol. 3. Batoid fishes, chimaeras and bony fishes part 2 (Mugilidae to Carangidae). FAO, Rome.
- Collette, B. B. 2002a. Echeneidae, remoras (sharksuckers, discfishes). Pp. 1414–1419. In: Carpenter, K. E. (ed), FAO species identification guide for fishery purposes and American Society of Ichthyologists and Herpetologists Special Publication no. 5. The living marine resources of the western central Atlantic. Vol. 3. Bony fishes part 2 (Opisthognathidae to Molidae), sea turtles and marine mammals. FAO, Rome.
- Collette, B. B. 2002b. Rachycentridae, cobia. Pp. 1420–1421. In: Carpenter, K. E. (ed), FAO species identification guide for fishery purposes and American Society of Ichthyologists and Herpetologists Special Publication no. 5. The living marine resources of the western central Atlantic. Vol. 3. Bony fishes part 2 (Opisthognathidae to Molidae), sea turtles and marine mammals. FAO, Rome.
- Collette, B. B. 2016a. Echeneidae (remoras, sharksuckers, discfishes). Pp. 2441–2447. In: Carpenter, K. E. and De Angelis, N. (eds) FAO species identification guide for fishery purposes. The living marine resources of the eastern central Atlantic. Vol. 4. Bony fishes part 2 (Perciformes to Tetraodontiformes). FAO, Rome.
- Collette, B. B. 2016b. Rachycentridae, cobia. Pp. 2448–2449. In: Carpenter, K. E. and De Angelis, N. (eds) FAO species identification guide for fishery purposes. The living marine resources of the eastern central Atlantic. Vol. 4. Bony fishes part 2 (Perciformes to Tetraodontiformes). FAO, Rome.
- Félix, F. C. and Hackradt, C. W. 2008. Interaction between *Rachycentron canadum* and *Epinephelus itajara*, on the Paraná Coast, Brasil. *Coral Reefs*, 27 (3): 633.
- Girard, M. G., Davis, M. P. and Smith, W. L. 2020. The phylogeny of carangiform fishes: morphological and genomic investigations of a new fish clade. *Copeia*, 108 (2): 265–298.
- Godfrey, S. J. and Carnevale, G. 2020. A new cobia (Teleostei, Rachycentridae) species from the Miocene St. Marys Formation along Calvert Cliffs, Maryland, USA. *Journal of Paleontology*, 95 (3): 630–637.
- Gray, K. N., McDowell, J. R., Collette, B. B. and Graves, J. E. 2009. A molecular phylogeny of the remoras and their relatives. *Bulletin of Marine Science*, 84 (2): 183–198.
- Hart, J. L. 1973. Pacific fishes of Canada. *Bulletin of the Fisheries Research Board of Canada Bulletin* 180, Ottawa. 740 pp.
- Hata, H. 2020a. *Remora osteochir* (Cuvier, 1829). Pp. 266–267. In: Koeda, K., Hata, H., Yamada, M. and Motomura, H. (eds) *Fishes from markets in Osumi Peninsula, Kagoshima, Japan*. The Kagoshima University Museum, Kagoshima. (In Japanese)
- Hata, H. 2020b. *Rachycentron canadum* (Linnaeus, 1766). P. 269. In: Koeda, K., Hata, H., Yamada, M. and Motomura, H. (eds) *Fishes from markets in Osumi Peninsula, Kagoshima, Japan*. The Kagoshima University Museum, Kagoshima. (In Japanese)

- Hata, H. 2020c. First record of *Remora brachyptera* (Perciformes: Echeneidae) from Ogasawara Islands, Japan. *Bulletin of the Biogeographical Society of Japan*, 75: 54–61. (In Japanese)
- Hata, H., Itou, M. and Motomura, H. 2018. First records of *Remora albescens* (Perciformes: Echeneidae) from Kagoshima Prefecture, southern Japan. *Nature of Kagoshima*, 44: 249–252. (In Japanese)
- Hata, H. and Koeda, K. 2021. Records of *Remora australis* (Teleostei: Perciformes: Echeneidae) from Kinkasan Island, Miyagi Prefecture, northern Japan. *Nanki Seibutsu*, in press.
- Hatooka, K. and Kai, Y. 2013. Echeneidae, remoras. Pp. 872–874, 1989–1990. In: Nakabo, T. (ed) *Fishes of Japan with pictorial keys to the species* third edition. Tokai University, Press, Hadano. (In Japanese)
- Kamohara, T. 1958. A catalogue of fishes of Kochi Prefecture (Province Tosa), Japan. *Reports of the Usa Marine Biological Station*, 5 (1): 1–76.
- Kamohara, T. 1964. Revised catalogue of fishes of Kochi Prefecture, Japan. *Report of Usa Marine Biological Station*, 11: 1–99.
- Kishida, S. 1997. *Echeneis naucrates*. Pp. 310–311. In: Okamura, O. and Amaoka, K. (eds) *Sea fishes of Japan*. Yama-kei Publishers, Tokyo. (In Japanese)
- Koeda, K. 2019. Family Rachycentridae. P. 721. In: Koeda, K., and Ho, H.-C. (eds) *Fishes of southern Taiwan*. National Museum of Marine Biology & Aquarium, Pingtung.
- Kyne, P. M. 2015. Occurrence of a Sharksucker (*Echeneis naucrates*) on a Northern River Shark (*Glyphis garricki*) in a tidal riverine habitat. *Northern Territory Naturalis*, 26: 21–26.
- Lachner, E. A. 1973. Echeneidae. Pp. 636–640. In: Hureau, J. C. and Monod, Th. (eds) *Checklist of the fishes of the north-eastern Atlantic and of the Mediterranean*. CLOFNAM 1. UNESCO, Paris.
- Lachner, E. A. 1986. Echeneidae. Pp. 1329–1334. In: Whitehead, P. J. P., Bauchot, M.-L., Hureau, J.-C., Nielsen, J. and Tortonese, E. (eds) *Fishes of the north-eastern Atlantic and the Mediterranean*, vol. 3. UNESCO, Paris.
- Lachner, E. A. and Post, A. 1990. Echeneidae. Pp. 725–728. In: Quéro, J.-C., Hureau, J.-C., Karrer, C., Post, A. and Saldanha, L. (eds) *Check-list of the fishes of the eastern tropical Atlantic*. CLOFETA. UNESCO, Paris.
- Matsubara, K. 1955. *Fish morphology and hierarchy*. Parts I–III. Ishizaki Shoten, Tokyo. xi + 1605 pp., 135 pls. (In Japanese)
- Morota, A. and Fujita, K. 1995. Interrelationships of echeneids and their hosts, and the reproductive habits of *Remora osterochir* in Hawaiian waters. *Japanese Journal of Ichthyology*, 42 (2): 203–207. (In Japanese)
- Ogimoto, K., Kawai, T., Matsubara, H., Kubara, Y., Nagata, R. Kuwabara, S. and Katakura, Y. 2014. First record of *Remora remora* (Actinopterygii, Perciformes, Echeneidae) from the Okhotsk Sea. *Bulletin of the Biogeographical Society of Japan*, 69: 197–201. (In Japanese)
- O’Toole, B. 2002. Phylogeny of the species of the superfamily Echeneoidea (Perciformes: Carangoidei: Echeneidae, Rachycentridae, and Coryphaenidae), with an interpretation of echeneid hitchhiking behaviour. *Canadian Journal of Zoology*, 80: 596–623.

- Parenti, P. 2021. Checklist of fishes of the family Echeineidae. *International Journal of Zoological Investigations*, 7 (2): 566–573.
- Sasaki, K. 1997. *Rachycentron canadum*. Pp. 310–311. In: Okamura, O. and Amaoka, K. (eds) *Sea fishes of Japan*. Yama-kei Publishers, Tokyo. (In Japanese)
- Senou, H. 2013. Rachycentridae, cobia. Pp. 875, 1990. In: Nakabo, T. (ed) *Fishes of Japan with pictorial keys to the species*, third edition. Tokai University Press, Hadano. (In Japanese)
- Smith, J. W. and Merriner, J. V. 1982. Association of cobia, *Rachycentron canadum*, with Cownose Ray, *Rhinoptera bonasus*. *Estuaries*, 5 (3): 240–242.
- Storer, D. H. 1839. A report on the fishes of Massachusetts. *Boston Journal of Natural History*, 2 (nos. 3–4) (art. 12): 289–558, pls. 6–8.
- Strasburg, D. W. 1964. Further notes on the identification and biology of echeineid fishes. *Pacific Science*, 18: 51–57.
- Takamatsu, S. 1967. On the habit of cobia, *Rachycentron canadum* (Linnaeus), associating with sting ray, *Dasyatis maculatus* Miyoshi. *Japanese Journal of Ichthyology*, 14 (4): 183–186 + pls. 15–16. (In Japanese)
- Tanaka, S. 1914a. Figures and descriptions of the fishes of Japan including Riukiu Islands, Bonin Islands, Formosa, Kurile Islands, Korea and southern Sakhalin. Vol. 15: 247–262, pls. 71–75.
- Tanaka, S. 1914b. Figures and descriptions of the fishes of Japan including Riukiu Islands, Bonin Islands, Formosa, Kurile Islands, Korea and southern Sakhalin. Vol. 16: 263–278, pls. 76–80.
- Tanaka, S. 1915a. Figures and descriptions of the fishes of Japan including Riukiu Islands, Bonin Islands, Formosa, Kurile Islands, Korea and southern Sakhalin. Vol. 19: 319–342, pls. 91–95.
- Tanaka, S. 1915b. Figures and descriptions of the fishes of Japan including the Riukiu Islands, Bonin Islands, Kurile Islands, Korea, and southern Sakhalin. Vol. 20: 343–370, pls. 96–100.
- Tanaka, S. 1916. Figures and descriptions of the fishes of Japan including Riukiu Islands, Bonin Islands, Formosa, Kurile Islands, Korea and southern Sakhalin. Vol. 22: 383–398, pls. 106–110.
- Xan, L. 2005. Advances in the seed production of cobia *Rachycentron canadum* in Vietnam. *Aquaculture Asia Magazine*, 10 (3): 21–23.

Table 1. Frequency distribution of disc laminae in specimens of Echeueidae deposited in ZUMT.

	n	Disc laminae																																		
		9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29														
<i>Echeueis naurates</i>	20																																			
<i>Phieirichys lineatus</i>	7	2	4	1																																
<i>Remora albescens</i>	10				4	5	1																													
<i>Remora australis</i>	5																																			
<i>Remora brachyptera</i>	69							5	43	16	6																									
<i>Remora osteochir</i>	22									1	14	6	1																							
<i>Remora remora</i>	59									25	34	1																								



Fig. 1. Lateral (a), dorsal (b), and (c) ventral views of species of Echeneidae deposited in the Department of Zoology, The University Museum, The University of Tokyo (ZUMT). A: *Echeneis naucrates*, ZUMT 13309, 235.2 mm standard length (SL), Fukaura Town, Aomori Pref., Japan; B: *Phtheichthys lineatus*, ZUMT 48931, 48.2 mm SL, Banda Sea, Indonesia; C: *Remora albescens*, ZUMT 41292, 190.1 mm SL; D: *Remora australis*, ZUMT 38040, 192.3 mm SL, probably Japan; E: *Remora brachyptera*, ZUMT 62169, 106.5 mm SL, Sofu-gan Rock, Zunan Islands, Japan; F: *Remora osteochir*, ZUMT 49072, 251.4 mm SL, eastern Indian Ocean; G: *Remora remora*, ZUMT 54384, holotype of *Echeneis nubifera* Tanaka, 1915, 121.3 mm SL, Sagami Bay, Kanagawa Pref., Japan.

List of the specimens of families Haemulidae and Hapalogenyidae (Actinopterygii: Teleostei) deposited in the Department of Zoology, The University Museum, The University of Tokyo

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Abstract

A list of specimens of Haemulidae and Hapalogenyidae deposited in the Department of Zoology, The University Museum, The University of Tokyo is provided. No types are known for these families in ZUMT collection. 201 lots with 239 specimens of 16 haemulid and 106 lots with 107 specimens of four hapalogenyid species were observed.

Introduction

The grunts or sweetlips family Haemulidae includes two subfamilies, 21 genera and 136 valid species (Marceniuk et al. 2019; Parenti 2019; Damadi et al. 2020; Acevedo-Álvarez et al. 2021; Carvalho et al. 2021), 18 of them have been recorded from Japanese waters (Johnson et al. 2001; Shimada 2013; Johnson and Wilmer 2015; Hata et al. 2015; Naito et al. 2017; Motomura 2020). Although the recent molecular phylogenetic study shows that Haemulidae is related to the family Lutjanidae (Betancur-R et al. 2017), the former can be distinguished by presence of pores on ventral surface of lower jaw and scales on suborbital area, and lacking teeth on vomer and palatine (McKay 2001; Shimada 2013).

Hapalogenys, a genus traditionally has been placed in Haemulidae (e.g., McKay 2001; Shimada 2013), includes eight valid species (Iwatsuki and Russell 2006; Mohapatra et al. 2013). Although the phylogenetic position of *Hapalogenys* has been confused, the genus is frequently treated as a monotypic family, Hapalogenyidae in recent days (e.g., Mohapatra et al. 2013; Matsunuma et al. 2017; Ji et al. 2020; Wada 2020). Moreover, the genus is suggested as being phylogenetically related closer to the genera *Datonioides* and *Lobotes* (Betancur-R et al. 2017; Gill and Leis 2019) than genera included in Haemulidae. Although McKay (2001) suggested the close relationship between *Hapalogenys* and Dinopercidae, a family comprised by two species, *Centrarchops atlanticus* (Reinchenow, 1877) (distributed in eastern Atlantic) and *Dinoperca petersi* (Day, 1875) (western Indian Ocean; Heemstra and Hecht 1986), the relationship is still unclear. Species-level taxonomy of *Hapalogenys* is also well-researched, several new species have been described and taxonomic status of some nominal species were changed recently (Iwatsuki et al. 2000a, b; Iwatsuki and Nakabo 2005; Iwatsuki and Russell

2006; Mohapatra et al. 2013). For future taxonomic studies, a list of specimens of the two families deposited in the Department of Zoology, The University Museum, The University of Tokyo, including 16 and four haemulid and hapalogenyid species, respectively, is given below.

Materials and Methods

Specimens of Haemulidae and Hapalogenyidae in the Department of Zoology, The University Museum, The University of Tokyo (abbreviated as ZUMT) were identified during the present study, following McKay (2001) and Shimada (2013). The family placement of the genus *Hapalogenys* and the classification of genera of Haemilidae generally followed Betancur-R et al. (2017) and Parenti (2019) and exceptions are stated in remarks of each species. Contents included in parentheses following registration numbers as follows: [(standard length (in mm); specimen counts (if plural specimens included in the lot); collection locality; collection date; collector; some remarks (if available)]. Collection data of specimens are omitted when matching that of immediately following specimens.

The ZUMT specimens listed herein were stored in the Room 407 in the building of the museum. Most were stored in containers on shelves, although larger haemulid [ZUMT 62196, 62197, ZUMT ABE 3770, 60-1636, 62-1065 (*Diagramma pictum pictum*), ZUMT ABE 3719 (*Plectorhinchus albovittatus*), ZUMT ABE 2859, 3937 (*Plectorhinchus chaetodonoides*), ZUMT ABE 2848, 2915 (*Plectorhinchus chrysotaenia*), ZUMT 31503, 50526, 51538 (*Plectorhinchus cinctus*), 49156 (*Plectorhinchus flavomaculatus*), ZUMT 62184, ZUMT ABE 2928 (*Plectorhinchus lineatus*), ZUMT 62186 (*Plectorhinchus picus*)], and ZUMT ABE 2991 (*Pomadasys argenteus*) and hapalogenyid specimens [ZUMT 26333, 26337, 26338 (*Hapalogenys kishinouyei*), 11444, 31502, 47988, 50994, 51092, 51094, 51419, 51539, 62204 (*Hapalogenys nigripinnis*), 7916, 19371, 62200, 62201, and 62202 (*Hapalogenys sennin*)] were stored in glass tanks in the same room with the glass lid sealed with a silicon adhesive (as of Dec. 2021). Although some of the ZUMT specimens, collected by Dr. Tokiharu Abe, had not been registered into the ZUMT collection, with collection data of most missing, they are listed herein together with their ZUMT ABE number (number written on the label), in the hope that Dr. Abe's catalog books with collection data will be rediscovered in the future. Additionally, specimens with catalogue number ZUMT ABE 2700 to 6000 are recognized as specimens collected from Palau on 1930's (third author's observation).

Results

In the ZUMT fish collection, deposition of 201 lots with 239 specimens of 16 species of haemulids and 106 lots with 107 specimens of four species of hapalogenyids were confirmed. Based on Dr. Abe's collection, three species of haemulids (*Plectorhinchus lessonii*, *P. vittatus*, *Pomadasys argenteus*), were observed as the first specimen-based records of these species from Palau.

Species accounts

Family Haemulidae

Diagramma pictum pictum (Thunberg, 1792) コロダイ

JAPAN

TOKYO MARKET ZUMT 11824 (78.2 mm), ZUMT 11829 (88.3 mm), ZUMT 11830 (94.2 mm), ZUMT 11832 (91.8 mm; obtained at Tokyo Market, Tokyo Met.)

HYOGO PREF. ZUMT 26835 (77.2 mm; Fukura, Minamiawaji City, Awaji-shima Island; 5 Mar. 1912; coll. by R. Uchimura)

WAKAYAMA PREF. ZUMT 8138 (80.1 mm; probably collected from Wakayama Pref.; coll. by I. Hoshino at Hiro, Hirokawa Town)

ZUMT 9580 (87.0 mm), ZUMT 9581 (89.6 mm; probably Wakayama Pref.; coll. by N. Ui at Tanabe City)

ZUMT 20569 (53.9 mm; Wakayama Pref.; Jan. 1920)

ZUMT 41019 (87.6 mm; Tatsugahama, Minoshima, Arida City; 20 Nov. 1941; coll. by M. Inoue)

ZUMT 40219 (62.5 mm; probably collected from Wakayama Pref.; coll. by K. Nakanishiki at Wakayama Pref.)

ZUMT 44467 (68.6 mm; Wakayama Pref.)

KAGAWA PREF. ZUMT 44468 (63.4 mm), ZUMT 44469 (87.6 mm; Marugame City)

EHIME PREF. ZUMT 28301 (51.0 mm), ZUMT 40222 (50.0 mm), ZUMT 40224 (53.0 mm), ZUMT 40225 (54.1 mm; probably collected from Ehime Pref.; donated from D. Tanaka at Saijo City)

KOCHI PREF. ZUMT 39168 (35.4 mm; probably Ukitsu, Muroto City)

SAGA PREF. ZUMT 6349 (44.3 mm; probably Saga Pref.; coll. by I. Kanekasu at Ogi Junior High School)

NAGASAKI PREF. ZUMT 2324 (126.1 mm; Nagasaki Pref.; 27 June 1909)

ZUMT 43488 (16 specimens, 28.4–57.0 mm), ZUMT 43565 (33.3 mm), ZUMT 43567 (28.4 mm), ZUMT 43568 (39.9 mm; Nagasaki Pref.; Feb. 1912)

ZUMT 43741 (34.6 mm), ZUMT 62608 (86.3 mm), ZUMT 62209 (84.1 mm; Nagasaki Pref.)

ZUMT 52059 (142.1 mm; obtained at Nagasaki Fish Market; 1957)

OITA PREF. ZUMT 2809 (47.8 mm; Nakatsu City; Aug. 1910)

KAGOSHIMA PREF. ZUMT 12323 (83.1 mm; obtained at Kagoshima Fish Market; 18 Mar. 1920)

ZUMT 24141 (78.1 mm; Arata, Kagoshima City)

OKINAWA PREF. ZUMT 11159 (40.1 mm; probably Okinawa Pref.; coll. by S. Sakaguchi at Okinawa Prefectural Daiichi Junior High School)

EAST CHINA SEA

ZUMT 51040 (178.9 mm; East China Sea; Dec. 1958)

TAIWAN

ZUMT 5189 (117.6 mm), ZUMT 40284 (88.5 mm), ZUMT 40285 (83.5 mm; Yilan County; Sept. 1896; coll. by K. Tada)
ZUMT 62208 (169.1 mm; obtained at Ximending Market, Taipei City; 17 Oct. 1930)

PALAU

ZUMT ABE 3008 (150.5 mm), ZUMT ABE 3770 (286.1 mm), ZUMT ABE 4068 (105.7 mm; Palau)

INDONESIA

ZUMT 62620 (151.8 mm; Jakarta, Java; 5 Mar. 1909; coll. by I. Iijima and K. Aoki)

LOCALITY UNKNOWN

ZUMT 26742 (45.2 mm), ZUMT 27947 (41.6 mm), ZUMT 62196 (225.1 mm), ZUMT 62197 (213.3 mm), ZUMT ABE 60-1636 (222.6 mm), ZUMT ABE 61-1065 (210.5 mm; no data)

Remarks. See Johnson et al. (2001) about the nomenclature and classification of this subspecies.

Parapristipoma trilineatum (Thunberg, 1793) イサキ

JAPAN

TOKYO MARKET ZUMT 6739 (120.4 mm), ZUMT 11835 (57.4 mm; obtained at Tokyo Market, Tokyo Met.)

ZUMT 26378 (183.4 mm), ZUMT 26379 (173.8 mm; obtained at Tokyo Market; June 1929; coll. by I. Tomiyama)

KANAGAWA PREF. ZUMT 30079 (115.9 mm), ZUMT 30080 (119.8 mm; Hayama Town; Aug. 1934)

ZUMT 34280 (129.8 mm; Misaki, Miura City)

ZUMT 55643 (100.9 mm), ZUMT 55644 (98.8 mm), ZUMT 55645 (106.8 mm; obtained at Misaki Fish Market, Miura City; 29 July 1986)

SHIZUOKA PREF. ZUMT 6007 (98.5 mm; Shizuura, Numazu City; Feb. 1915; coll. by K. Hattori)

ZUMT 26663 (23.6 mm), ZUMT 26664 (21.0 mm), ZUMT 26665 (21.4 mm), ZUMT 26666 (18.1 mm), ZUMT 26667 (18.1 mm), ZUMT 33849 (38.1 mm), ZUMT 33869 (34.6 mm; Shizuura, Numazu City)

ZUMT 40181 (96.9 mm; probably collected from Shizuoka Pref.; donated from Shizuoka Normal School in Shizuoka City)

TOYAMA PREF. ZUMT 45105 (79.4 mm; Uozu or Namerikawa City; June 1932; coll. by I. Tomiyama)

KYOTO PREF. ZUMT 24358 (104.0 mm; Miyazu City.; Nov. 1931; coll. by Kyoto Prefectural Fisheries Training Center)

HYOGO PREF. ZUMT 7413 (76.7 mm; Moroyose, Shin'onsen Town; coll. by Y. Yamadori)
ZUMT 23659 (38.0 mm; Hamasaka City; Aug. 1930; coll. by T. Kamohara)
ZUMT 42940 (47.5 mm), ZUMT 44514 (63.7 mm; Sumoto City, Awaji-shima Island)

WAKAYAMA PREF. ZUMT 8002 (50.2 mm; probably collected from Wakayama Pref.; coll. by N. Ui at Tanabe City)

SHIMANE PREF. ZUMT 31289 (154.6 mm; Matsue City)

YAMAGUCHI PREF. ZUMT 27065 (131.8 mm; Yamaguchi Pref.; 7 June 1934)

NAGASAKI PREF. ZUMT 2286 (96.1 mm; Nagasaki Pref.; 27 June 1909)

ZUMT 12873 (154.7 mm; Kaba-shima Island, Nagasaki City)

ZUMT 31959 (106.3 mm; Nagasaki Pref.)

ZUMT 48036 (204.1 mm; Hirado City, Hirado Island; 29 May 1953; coll. by I. Tomiyama)

KAGOSHIMA PREF. ZUMT 44492 (70.4 mm; Kagoshima Pref.; Aug. 1930; coll. by I. Tomiyama)

PRECISE LOCALITY UNKNOWN ZUMT 27928 (63.7 mm), ZUMT 27929 (55.4 mm; probably southern Japan)

TAIWAN

ZUMT 2163 (2 specimens, 169.1–185.6 mm; Keelung)

LOCALITY UNKNOWN

ZUMT 46430 (155.2 mm), ZUMT 46536 (126.8 mm), ZUMT-ABE 61-923 (125.1 mm; no data)

ZUMT 37726 (123.6 mm; locality unknown; coll. by S. Saito)

ZUMT 62589 (227.0 mm; locality unknown, stored with a paper written “occurred in 尾榮”; 18 Jan. 1980)

Plectorhinchus albovittatus (Rüppell, 1838) **ダイダイコシヨウダイ**

JAPAN

ZUMT 60244 [69.6 mm; estuary of Omija-gawa River, Iriomote-jima Island, Yaeyama Islands, Ryukyu Archipelago; 20 Aug. 1989]

PHILIPPINES

ZUMT 42211 (107.3 mm; Philippines; 1926; coll. by U. Yamamura)

PALAU

ZUMT ABE 3719 (220.3 mm; Palau)

Plectorhinchus chaetodonoides Lacepède, 1801 チョウチョウコシヨウダイ

PALAU

ZUMT ABE 2859 (324.6 mm), ZUMT ABE 3937 (235.4 mm; Palau)

PHILIPPINES

ZUMT 42313 (93.3 mm; Philippines; 1926; coll. by U. Yamamura)

Plectorhinchus chrysotaenia (Bleeker, 1855) ニジコシヨウダイ

PALAU

ZUMT ABE 2848 (309.9 mm), ZUMT ABE 2915 (287.5 mm; Palau)

Plectorhinchus cinctus (Temminck & Schlegel, 1843) コシヨウダイ

JAPAN

YAMAGATA PREF. ZUMT 35935 (30.8 mm; Sakata Port, Sakata City; 16 Aug. 1936)

ZUMT 36380 (84.9 mm; Sakata Port, Sakata City)

FUKUSHIMA PREF. ZUMT 34071 (81.2 mm; probably collected from Fukushima Pref.;
donated from H. Kakuta at Onahama, Iwaki City)

TOKYO MARKET ZUMT 11834 (44.3 mm; obtained at Tokyo Market, Tokyo Met.)

ZUMT 26357 (121.4 mm; obtained at Tokyo Market; 1929)

SHIZUOKA PREF. ZUMT 10972 (75.7 mm; Hamana-ko Lake; coll. by T. Sasaki)

NIIGATA PREF. ZUMT 24455 (112.7 mm; Niigata Pref.)

TOYAMA PREF. ZUMT 41238 (134.2 mm), ZUMT 41241 (141.8 mm), ZUMT 41242 (161.3
mm), ZUMT 41243 (134.6 mm), ZUMT 41244 (140.0 mm), ZUMT 41323 (122.2 mm;
Uozu or Namerikawa City; coll. by I. Tomiyama)

KYOTO PREF. ZUMT 62189 (72.4 mm; Hatta, Maizuru; 10 Sept. 1911)

HYOGO PREF. ZUMT 7426 (52.9 mm; Takasago City; coll. by Y. Yamadori)

ZUMT 44553 (24.9 mm; Sumoto City, Awaji-shima Island)

WAKAYAMA PREF. ZUMT 18117 (68.0 mm; probably collected from Wakayama Pref.; coll.
by I. Hoshino at Kainan Junior High School)

ZUMT 21716 (91.7 mm; Wakayama Pref.; Feb. 1905)

ZUMT 21996 (58.2 mm; Wakayama Pref.; Jan. 1920)

SHIMANE PREF. ZUMT 31503 [ca. 417.0 mm SL (bisected into front and back); probably
collected from Shimane Pref.; donated from R. Yamai at Matsue High School)

KOCHI PREF. ZUMT 33960 (38.9 mm; Kochi Pref.; 8 Apr. 1904; coll. by S. Tanaka)

FUKUOKA PREF. ZUMT 35002 (136.3 mm; Ariake Sea, Okinohata, Yanagawa City; 28 May 1931)
ZUMT 35564 (142.4 mm), ZUMT 35565 (113.9 mm; Ariake Sea, Okinohata, Yanagawa
City; Oct. 1931; coll. by I. Tomiyama)

ZUMT 62209 (82.4 mm; Fukuoka Pref.; 25 Aug. 1931)

NAGASAKI PREF. ZUMT 5066 (143.0 mm; Nagasaki Pref.; 3 Oct. 1909; coll. by I. Kaneko)
OITA PREF. ZUMT 7400 (87.2 mm; probably collected from Oita Pref.; donated from K. Suito at Oita Prefectural Saeki Junior High School)

ZUMT 16550 (58.6 mm; Oita City; coll. by Y. Yamamoto)

KAGOSHIMA PREF. ZUMT 23845 (125.6 mm), ZUMT 23846 (113.6 mm), ZUMT 24078 (90.4 mm), ZUMT 24079 (95.6 mm; Taniyama, Kagoshima City)

ZUMT 24012 (75.1 mm), ZUMT 24013 (79.3 mm), ZUMT 24014 (62.5 mm; Shibushi City)

ZUMT 25236 (126.4 mm), ZUMT 25279 (100.0 mm; Yamaguchi Pref.; coll. by M. Nagatomi)

ZUMT 33729 (86.0 mm), ZUMT 33730 (74.9 mm), ZUMT 33731 (72.7 mm), ZUMT 33732 (54.2 mm; probably collected from Kagoshima Pref.; donated from T. Arii at Sendai Junior High School)

PRECISE LOCALITY UNKNOWN ZUMT 34784 (67.6 mm), ZUMT 34797 (61.4 mm; Japan)

TAIWAN

ZUMT 62210 (188.8 mm), ZUMT 62211 (186.4 mm; obtained at Tamsui Fish Market, Taipei City; 3 Mar. 1931)

CHINA

ZUMT 41146 (112.7 mm; Guangdong Province)

ZUMT 51538 [193.5 mm; East China Sea, east of Zhoushan City, Zhejiang Province (30°45'N–30°15'N, 124°15'E); 1 Apr. 1960]

EAST CHINA SEA

ZUMT 50526 (220.0 mm; East China Sea; 18 Apr. 1959; coll. by Y. Tominaga)

LOCALITY UNKNOWN

ZUMT 26743 (69.4 mm), ZUMT 26762 (78.7 mm), ZUMT 26763 (64.4 mm; no data)

ZUMT 62188 [135.9 mm; no data (tagged “094”)]

Plectorhinchus flavomaculatus (Cuvier, 1830) オシヤレコシヨウダイ

JAPAN

ZUMT 21895 (3 specimens, 85.5–88.0 mm; obtained at Tokyo Market, Tokyo Met.)

ZUMT 49156 (251.8 mm; Joga-shima Island, Misaki, Miura City, Kanagawa Pref.; 1956; coll. by I. Tomiyama)

Remarks. ZUMT 49156 was reported by Hata and Koeda (2021) as the first record of the species from Sagami Sea.

Plectorhinchus gibbosus (Lacepède, 1802) クロコシヨウダイ

PHILIPPINES

ZUMT 14631 (59.5 mm; Philippines)

ZUMT 42343 (126.2 mm; Basilan; 1926; coll. by U. Yamamura)

Plectorhinchus picus (Cuvier, 1828) アジアコシヨウダイ

JAPAN

ZUMT 29744 (61.8 mm; Misaki, Miura City, Kanagawa Pref.)

ZUMT 62186 (382.4 mm; Ogasawara Islands; 1913)

Plectorhinchus lessonii (Cuvier, 1830) ヒレグロコシヨウダイ
(Fig. 1A)

JAPAN

ZUMT 13731 [173.3 mm; Itoman City (Okinawa-jima Island, Ryukyu Archipelago); Aug. 1921; coll. by C. Gusukuma]

ZUMT 16937 [147.4 mm; Itoman City (Okinawa-jima Island, Ryukyu Archipelago); coll. by S. Tanabe]

PALAU

ZUMT ABE 4069 (153.8 mm; Palau)

Plectorhinchus lineatus (Linnaeus, 1758) アヤコシヨウダイ

JAPAN

ZUMT 14696 (238.9 mm; Yaeyama Islands, Ryukyu Archipelago)

ZUMT 17259 [47.3 mm; Unten, Nakijin Village (Okinawa-jima Island, Ryukyu Archipelago)]

PALAU

ZUMT ABE 2928 (325.0 mm; Palau)

LOCALITY UNKNOWN

ZUMT 62184 (276.3 mm; no data)

Plectorhinchus vittatus (Linnaeus, 1758) ムスジコシヨウダイ
(Fig. 1B)

PHILIPPINES

- ZUMT 11048 (120.9 mm), ZUMT 11049 (134.3 mm; Philippines; collected by U. Yamamura)
ZUMT 14595 (113.8 mm; Philippines)

PALAU

- ZUMT ABE 2868 (181.4 mm; Palau)

Pomadasys argenteus (Forsskål, 1775) ホシミゾイサキ
(Fig. 1C)

JAPAN

- ZUMT 13993 (178.6 mm; probably Okinawa-jima Island, Ryukyu Archipelago; coll. by S. Sakaguchi at Okinawa Prefectural Daiichi Junior High School)
ZUMT 17113 (154.2 mm), ZUMT 17114 (122.8 mm; Baten, Nanjo City, Okinawa-jima Island, Ryukyu Archipelago; coll. by S. Tanabe)
ZUMT 38902 (142.0 mm), ZUMT 38903 (147.7 mm; Okinawa Pref.)

PHILIPPINES

- ZUMT 12680 (218.9 mm; Philippines; coll. by U. Yamamura)
ZUMT 40773 (111.6 mm; Manila, Luzon; 11 Sept. 1909; coll. by I. Iijima and K. Aoki)
ZUMT 42248 (158.2 mm; Philippines; 11 Feb. 1909; coll. by I. Iijima and K. Aoki)
ZUMT 42315 (185.0 mm; Basilan; 1926; coll. by U. Yamamura)

PALAU

- ZUMT ABE 2991 (259.9 mm), ZUMT ABE 4071 (72.7–118.1 mm; 13 specimens), ZUMT ABE 4072 (85.0–106.5 mm; 9 specimens; Palau)

Pomadasys kaakan (Cuvier, 1830) カガヤキミゾイサキ

TAIWAN

- ZUMT 2500 (155.8 mm; obtained at Kaohsiung Market; Sept. 1908; coll. by K. Akamatsu)
ZUMT 14993 (129.1 mm; Tainan; coll. by T. Aoki)
ZUMT 62550 (174.1 mm), ZUMT 62551 (167.0 mm; obtained at Tamsui Fish Market, Taipei City; 8 Mar. 1931)
ZUMT 62552 (112.9 mm), ZUMT 62553 (104.9 mm), ZUMT 62554 (120.5 mm; obtained at Tamsui Fish Market, Taipei City; 3 Mar. 1931)

CHINA

ZUMT 41153 (104.2 mm), ZUMT 41154 (108.3 mm; Guangdong Province)

PHILIPPINES

ZUMT 42358 (179.4 mm; Basilan; 1926; coll. by U. Yamamura)

LOCALITY UNKNOWN

ZUMT 62555 (154.2 mm; no data)

Pomadasys maculatus (Bloch, 1793) マダラミゾイサキ

TAIWAN

ZUMT 2180 (118.2 mm; Tainan)

ZUMT 4811 (78.0 mm; Keelung)

ZUMT 14878 (91.8 mm), ZUMT 14879 (89.5 mm), ZUMT 14880 (118.9), ZUMT 14881 (95.2 mm; Tainan; coll. by T. Aoki)

PHILIPPINES

ZUMT 39590 (86.2 mm; Philippines; coll. by U. Yamamura)

ZUMT 40781 (125.1 mm), ZUMT40800 (109.4 mm; Manila, Luzon; 11 Feb. 1909; coll. by I. Iijima and K. Aoki)

INDONESIA

ZUMT 62631 (102.9 mm; Jakarta, Java; 5 Mar. 1909; coll. by I. Iijima and K. Aoki)

Pomadasys quadrilineatus Shen & Lin, 1984 スジミゾイサキ

TAIWAN

ZUMT 62564 (102.9 mm; obtained at Ximending Market, Taipei City; 16 Oct. 1930)

Family Hapalogenyidae

Hapalogenys analis Richardson, 1845 セトダイ

JAPAN

HYOGO PREF. ZUMT 42941 (62.3 mm), ZUMT 42942 (66.8 mm), ZUMT 44551 (91.1 mm; Sumoto City, Awaji-shima Island)

WAKAYAMA PREF. ZUMT 7495 (144.2 mm; probably collected from Wakayama Pref.; coll. by I. Hoshino at Hiro, Arida City)

SHIMANE PREF. ZUMT 31515 (138.8 mm; probably collected from Shimane Pref.; donated from R. Yanai at Matsue High School)

YAMAGUCHI PREF. ZUMT 11449 (120.2 mm; Shimonoseki City; coll. by T. Kumada)
KOCHI PREF. ZUMT 17631 (123.6 mm; off Kochi Pref.; 21 May 1927; coll. by Y. Yamamoto)
FUKUOKA PREF. ZUMT 26340 (139.4 mm; Ariake Sea, Okinohata, Yanagawa City; Oct. 1931; coll. by I. Tomiyama)
ZUMT 49816 (116.9 mm), ZUMT 49836 (153.7 mm; obtained at Fukuoka Fish Market; 28 July 1959)
ZUMT 62205 (142.7 mm; Fukuoka Pref., Japan; 27 Aug. 1931)
ARIAKE SEA ZUMT 26602 (120.2 mm), ZUMT 26603 (123.7 mm), ZUMT 26605 (111.9 mm), ZUMT 26606 (117.9 mm), ZUMT 26607 (127.7 mm; Ariake Sea; Oct. 1931; coll. by I. Tomiyama)
NAGASAKI PREF. ZUMT 6652 (104.2 mm; Nagasaki Pref.; Oct. 1915; coll. by I. Kaneko)
ZUMT 33532 (50.0 mm; Nagasaki Pref.)
ZUMT 47997 (115.4 mm; obtained at Sasebo Fish Market, Sasebo City; 28 May 1953; coll. by I. Tomiyama)

KOREA

ZUMT 26604 [115.6 mm; Korea (obtained at Tokyo Market, Tokyo Met., Japan)]

CHINA

ZUMT 21225 (110.9 mm; China)
ZUMT 54503 (45.7 mm), ZUMT 54504 [90.1 mm; east of Yancheng City, Jiangsu Province, Yellow Sea (34°15'N 122°10'E), depth 25 m; 12 Oct. 1984; coll. by *RV 8th Ten-yo maru*]
ZUMT 54472 [136.5 mm; east of Nantong City, Jiangsu Province, East China Sea (32°35'N 122°40'E), depth 23 m; 11 Oct. 1984; coll. by *RV 8th Ten-yo maru*]

EAST CHINA SEA

ZUMT 50548 (159.0 mm), ZUMT 50549 (158.9 mm; East China Sea; 28 July 1959)
ZUMT 51093 (130.2 mm), ZUMT 51106 (79.0 mm; East China Sea; Dec. 1959)
ZUMT 51540 (58.8 mm), ZUMT 51541 (110.7 mm), ZUMT 51544 (86.9 mm), ZUMT 51561 (78.5 mm), ZUMT 51608 (73.6 mm), ZUMT 51655 (76.6 mm), ZUMT 51656 (70.1 mm), ZUMT 51657 (56.0 mm), ZUMT 51572 (72.2 mm; East China Sea; 28 Mar. Apr. 1960)
ZUMT 51695 [80.0 mm; East China Sea, east of Zhoushan City, Zhejiang Province (30°45'N–30°15'N, 124°15'E); Apr. 1960]
ZUMT 51738 (98.8 mm), ZUMT 51764 (84.1 mm), ZUMT 51765 (86.1 mm), ZUMT 51766 (79.5 mm), ZUMT 51767 (69.9 mm), ZUMT 51816 (74.4 mm), ZUMT 51817 (75.8 mm), ZUMT 51818 (89.8 mm), ZUMT 51819 (73.8 mm), ZUMT 51820 (80.4 mm), ZUMT 51821 (86.7 mm), ZUMT 52336 (129.4 mm), ZUMT 52337 (108.6 mm; East China Sea)
ZUMT 52245 (92.5 mm; East China Sea; 5 May 1960)
ZUMT 62185 [107.0–115.3 mm; 2 specimens; East China Sea (obtained at Fukuoka Fish Market), 22 Mar. 1963]

LOCALITY UNKNOWN

ZUMT 46429 (132.0 mm), ZUMT 62206 (139.1 mm; no data)

Hapalogenys kishinouyei Smith & Pope, 1906 シマセトダイ

JAPAN

ZUMT 6551 (103.6 mm; Nagasaki Pref.; Sept. 1915; coll. by I. Kaneko)

ZUMT 7335 (81.1 mm), ZUMT 33533 (44.2 mm; Nagasaki Pref.; coll. by I. Kaneko)

ZUMT 19990 (68.0 mm; Kagoshima Pref.)

ZUMT 44552 (65.0 mm; Sumoto City, Awaji-shima Island, Hyogo Pref.)

KOREA

ZUMT 26338 [154.5 mm; Korean Peninsula (obtained at Tokyo Market, Tokyo Met., Japan)]

TAIWAN

ZUMT 26337 (182.7 mm; Taipei City)

EAST CHINA SEA

ZUMT 51047 (99.0 mm; East China Sea; Dec. 1959)

Hapalogenys nigripinnis (Temminck & Schlegel, 1843) ヒゲソリダイ

JAPAN

YAMAGATA PREF. ZUMT 62183 (164.9 mm; Sakata City; 17 July 1933)

TOKYO MARKET ZUMT 26335 (165.4 mm; obtained at Tokyo Market, Tokyo Met.; 1929)

NIIGATA PREF. ZUMT 24457 (170.1 mm; Niigata Pref.)

ZUMT 26601 (168.3 mm; Kashiwazaki City)

WAKAYAMA PREF. ZUMT 7494 (156.1 mm; probably collected from Wakayama Pref. (donated from I. Hoshino at Hiro, Hirokawa Town))

OKAYAMA PREF. ZUMT 16438 (112.0 mm), ZUMT 16515 (150.6 mm; Kanaura, Kasaoka City; coll. by K. Matsushima)

SHIMANE PREF. ZUMT 31502 [ca. 345.6 mm SL (bisected into front and back); probably collected from Shimane Pref.; donated from R. Yanai at Matsue High School]

YAMAGUCHI PREF. ZUMT 11444 (185.5 mm; Shimonoseki; coll. by T. Kumada)

FUKUOKA PREF. ZUMT 26336 (138.3 mm; Okinohata, Yanagawa City; Oct. 1931; coll. by I. Tomiyama)

NAGASAKI PREF. ZUMT 47988 (200.1 mm), ZUMT 47989 (166.0 mm; Obtained at Sasebo Fish Market; 28 May, 1953; coll. by I. Tomiyama)

CHINA

ZUMT 51539 [198.3 mm; East China Sea, east of Zhoushan City, Zhejiang Province (30°45'N–30°15'N, 124°15'E); 1 Apr. 1960]

EAST CHINA SEA

ZUMT 50994 (223.6 mm), ZUMT 51094 (158.1 mm), ZUMT 51419 (145.5 mm; East China Sea; Sept. 1959)

ZUMT 51092 (291.1 mm; East China Sea, Dec. 1959)

LOCALITY UNKNOWN

ZUMT 26341 (156.6 mm), ZUMT 62171 (102.5 mm), ZUMT 62204 (177.1 mm), ZUMT 46408 (130.5 mm; no data)

Hapalogenys sennin Iwatsuki & Nakabo, 2005 ヒゲダイ

JAPAN

TOKYO MARKET ZUMT 3885 (181.9 mm), ZUMT 26334 (138.9 mm; obtained at Tokyo Market, Tokyo Met.)

ZUMT 26333 (174.1 mm; obtained at Tokyo Market; 1929)

IZU ISLANDS ZUMT 19371 (246.7 mm; Hachijo-jima Island; donated from Y. Oshizu)

CHIBA PREF. ZUMT 24167 (91.1 mm; Kamogawa City)

MIE PREF. ZUMT 7916 (177.4 mm; probably collected from Mie Pref.; donated from O, Taniguchi at Momotori, Toba City)

WAKAYAMA PREF. ZUMT 22015 (43.9 mm; Wakayama Pref.; Jan. 1920)

TOYAMA PREF. ZUMT 26046 (43.8 mm; Toyama Pref.; coll. by K. Kikuchi at Toyama High School)

FUKUI PREF. ZUMT 5398 (33.3 mm; Sugitsu, Tsuruga City; 8 Aug. 1911)

HYOGO PREF. ZUMT 9865 (36.8 mm; probably coast of Seto Inland Sea in Hyogo Pref.; coll. by Y. Yamadori at Mikage Normal School, Kobe City)

ZUMT 34490 (38.3 mm; Tatsuno City; July 1916; coll. by U. Inugami)

ZUMT 44671 (39.6 mm; Sumoto City, Awaji-shima Island)

HIROSHIMA PREF. ZUMT 18491 (141.3 mm; Tadanoumi, Takehara City)

YAMAGUCHI PREF. ZUMT 9884 (36.0 mm; Suo-oshima Island; coll. by T. Yamahara)

ZUMT 25320 (42.2 mm; Yamaguchi Pref.)

FUKUOKA PREF. ZUMT 35479 (49.5 mm; Okinohata, Yanagawa City; Oct. 1931; coll. by I. Tomiyama)

LOCALITY UNKNOWN

ZUMT 26740 (38.2 mm), ZUMT 38087 (33.6 mm), ZUMT 39349 (58.2 mm), ZUMT 62200 (170.6 mm), ZUMT 62201 (201.8 mm), ZUMT 62202 (230.3 mm; no data)

Remarks. Tanaka (1914) reported ZUMT 3885 as *H. nigripinnis*, the name had long been applied for *H. sennin* (ヒゲダイ) and currently applied for the species long regarded as *Hapalogenys nitens* Richardson, 1844 (ヒゲソリダイ) (Iwatsuki and Nakabo 2005).

Acknowledgements

We are deeply grateful to the late Y. Tominaga for his dedication and efforts to the ZUMT collection. We thank I. Abe, S. Fujiwara, A. Inuma, M. Saito, A. Takahashi, H. Ogata and other volunteers for the opportunity to examine the present specimen and curatorial assistance. We greatly appreciated providing information on specimen collection cite by T. Yoshida (Marine Ecology Research Institute) for providing information on specimen collection sites. This study was supported in part by the Sasakawa Scientific Research Grant from the Japan Science Society (28-745, 2021-4064); a Grant-in-Aid from the Japan Society for the Promotion of Science for JSPS Fellows (DC2: 29-6652); JSPS KAKENHI Grant Numbers 19K23691 and 21K06313JP.

References

- Acevedo-Álvarez, E. A., Ruiz-Campos, G. and Domínguez-Domínguez, O. 2021. Population-level morphological variation of *Anisotremus interruptus* (Gill, 1862) (Perciformes: Haemulidae) in the Tropical Eastern Pacific, with the description of two new species. *Zootaxa*, 4975 (1): 141–158.
- Betancur-R., R., Wiley, E. O., Arratia, G., Acero, A., Bailly, N., Miya, M., Lecointre, G. and Ortí, G. 2017. Phylogenetic classification of bony fishes. *BMC Evolutionary Biology*, 17: 162. DOI: 10.1186/s12862-017-0958-3
- Carvalho, C. O., Marceniuk, A. P., Oliveira, C. and Wosiacki, W. B. 2021. Integrative taxonomy of the species complex *Haemulon steindachneri* (Jordan and Gilbert, 1882) (Eupercaria; Haemulidae) with a description of a new species from the western Atlantic. *Zoology*, 141: Art. 125782.
- Damadi, E., Moghaddam, F. Y., Ghassemzadeh, F. and Ghanbarifardi, M. 2020. *Plectorhinchus makranensis* (Teleostei, Haemulidae), a new species of sweetlips from the Persian Gulf and the Gulf of Oman. *ZooKeys*, 980: 141–154.
- Gill, A. C. and Leis, J. M. 2019. Phylogenetic position of the fish genera *Lobotes*, *Datnioides* and *Hapalogenys*, with a reappraisal of acanthuriform composition and relationships based on adult and larval morphology. *Zootaxa*, 4680 (1): 1–81.
- Hata, H., Ito, M. and Motomura, H. 2015. First Japanese record of the haemulid fish *Pomadasys kaakan* (Perciformes), from Kagoshima Prefecture, southern Japan. *Species Diversity*, 20: 115–120.
- Hata, H. and Koeda, K. 2021. Northernmost record of Lemon Sweetlips, *Plectorhinchus flavomaculatus* (Teleostei: Perciformes: Haemulidae) from Joga-shima Island, Sagami Bay, Japan. *Bulletin of the Biogeographical Society of Japan*, 76: 75–80. (In Japanese)
- Heemstra, P. C. and Hecht, T. 1986. Dinopercaidae, a new family for the percoid marine fish genera *Dinoperca* Boulenger and *Centrarchops* Fowler (Pisces: Perciformes). *Ichthyological Bulletin of the J. L. B. Smith Institute of Ichthyology*, 51: 1–20.
- Iwatsuki, Y. and Nakabo, T. 2005. Redescription of *Hapalogenys nigripinnis* (Schlegel in Temminck & Schlegel, 1843), a senior synonym of *H. nitens* Richardson, 1844, and a new species from Japan. *Copeia*, 2005 (4): 854–867.

- Iwatsuki, Y., Paepke, H.-J., Kimura, S. and Yoshino, T. 2000. A poorly known haemulid fish, *Hapalogenys meyenii* Peters, 1866, a junior synonym of *Parapristipoma trilineatum* (Thunberg, 1793). *Ichthyological Research*, 47 (4): 393–396.
- Iwatsuki, Y. and Russell, B. C. 2006. Revision of the genus *Hapalogenys* (Teleostei: Perciformes) with two new species from the Indo-West Pacific. *Memoirs of the Museum of Victoria*, 63 (1): 29–46.
- Iwatsuki, Y., Satapoomin, U. and Amaoka, K. 2000. New species: *Hapalogenys merguensis* (Teleostei; Perciformes) from Andaman Sea. *Copeia*, 2000 (1): 129–139.
- Ji, S.-C., Kim, J.-H., Jung, M.-H., Kim, J.-H., Kim, H.-W., Kim, M.-S., Myeong, J.-I. and Kim, D.-J. 2020. The complete mitochondrial genome analysis and phylogenetic position of the short barbeled grunter *Hapalogenys nigripinnis* (Lobotiformes: Hapalogenyidae) from Jeju Island, Korea. *Mitochondrial DNA Part B*, 5 (3): 3688–3689.
- Johnson, J. W., Randall, J. E. and Chenoweth, S. F. 2001. *Diagramma melanacrum* new species of haemulid fish from Indonesia, Borneo and the Philippines with a generic review. *Memoirs of the Queensland Museum*, 46 (2): 657–676.
- Johnson, J. W. and Wilmer, J. W. 2015. *Plectorhinchus caeruleonothus*, a new species of sweetlips (Perciformes: Haemulidae) from northern Australia and the resurrection of *P. unicolor* (Macleay, 1883), species previously confused with *P. schotaf* (Forsskål, 1775). *Zootaxa*, 3985: 491–522.
- Marceniuk, A. P., Caires, R. A., Machado, L., Cerqueira, N. N. C. D., Serra, R. R. M. S. and Oliveira, C. 2019. Redescription of *Orthopristis ruber* and *Orthopristis scapularis* (Haemulidae: Perciformes), with a hybridization zone off the Atlantic coast of South America. *Zootaxa*, 4576 (1): 109–126.
- Matsunuma, M., Yoshida, T. and Motomura, H. 2017. Records of *Spottobrotula mahodadi* (Ophidiiformes: Ophidiidae) and *Hapalogenys bengalensis* (Perciformes: Hapalogenyidae) from the Andaman Sea, with a note on the fresh coloration of *S. mahodadi*. *Species Diversity*, 22: 73–79.
- McKay, R. J. 2001. Haemulidae, grunts (also sweetlips, rubberlips, hotlips, and velvetchins). Pp. 2961–2989, pls. XIII–XV. In: Carpenter, K. E. and Niem, V. H. (eds), *FAO species identification guide for fishery purposes. The living marine resources of the western central Pacific, vol. 5. Bony fishes part 3 (Menidae to Pomacentridae)*. FAO, Rome.
- Mohapatra, A., Ray, D. and Kumar, V. 2013. A new fish species of the genus *Hapalogenys* (Perciformes: Hapalogenyidae) from the Bay of Bengal, India. *Zootaxa*, 3718 (4): 367–377.
- Motomura, H. (2020) List of Japan's all fish species. Current standard Japanese and scientific names of all fish species recorded from Japanese waters. The Kagoshima University Museum, Kagoshima, 560 pp. (In Japanese)
- Naito, T., Yamakawa, T. and Endo, H. 2017. First specimen-based record of the haemulid fish *Diagramma melanacrum* (Actinopterygii: Perciformes) from Japan. *Japanese Journal of Ichthyology*, 64 (2): 139–143. (In Japanese)
- Parenti, P. 2019. An annotated checklist of the fishes of the family Haemulidae (Teleostei: Perciformes). *Iranian Journal of Ichthyology*, 6 (3): 150–196.
- Shimada, K. 2013. Haemulidae, sweetlips and grunts. Pp. 940–945, 2008–2011. In: Nakabo, T. (ed) *Fishes of Japan with pictorial keys to the species third edition*. Tokai University Press, Hadano. (In Japanese)

- Tanaka, S. 1914. Figures and descriptions of the fishes of Japan including Riukiu Islands, Bonin Islands, Formosa, Kurile Islands, Korea and southern Sakhalin. Vol. 17: 279–294, pls. 81–85.
- Wada, H. 2020. Hapalogenyidae. Pp. 836–838. In: Koeda, K. and Ho, H.-C. (eds) Fishes of southern Taiwan second edition. National Museum of Marine Biology & Aquarium, Pingtung, Taiwan.

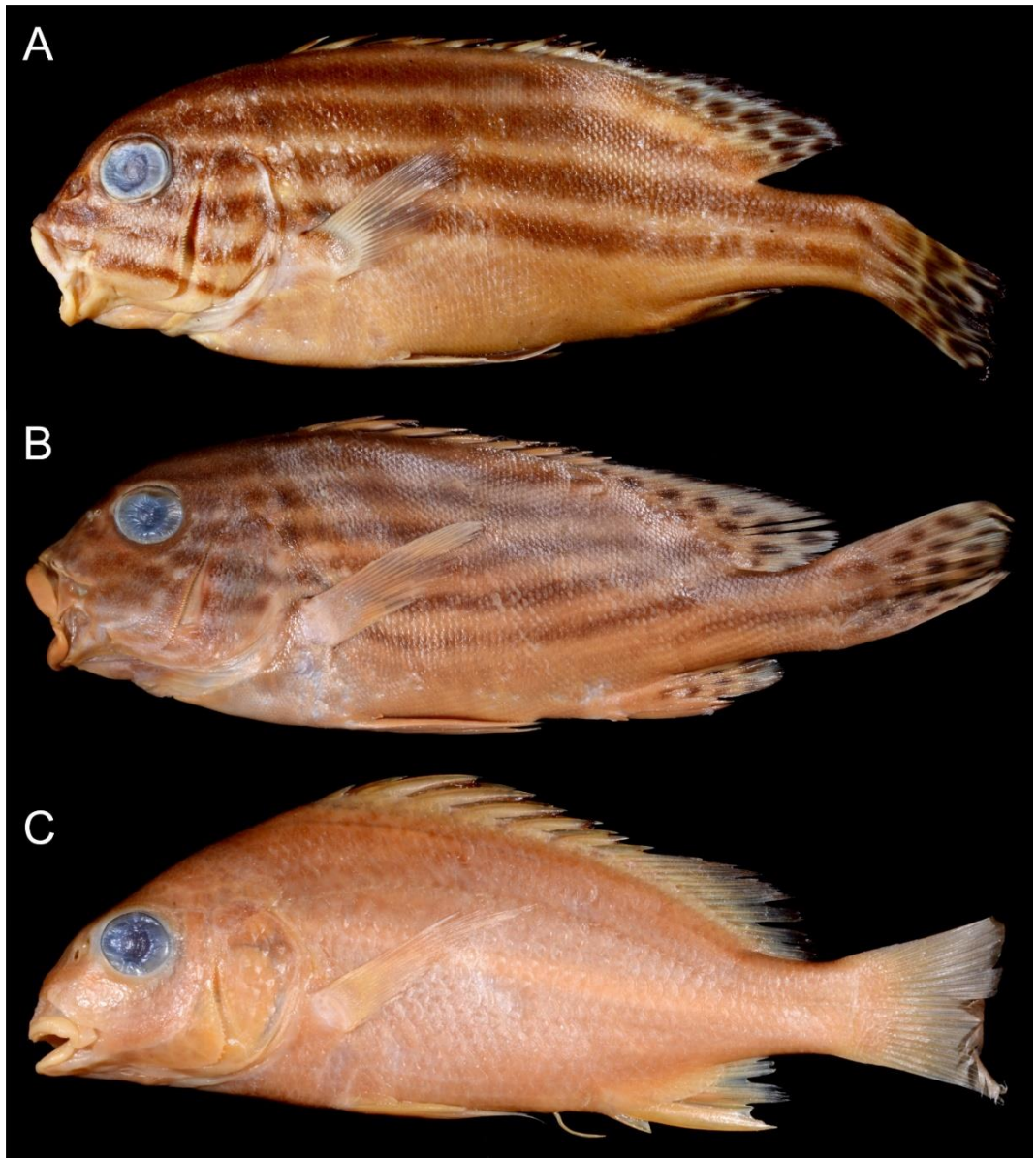


Fig. 1. Specimens of Haemulidae from Palau, deposited in ZUMT. (A) *Plectorhinchus lessonii* [ZUMT ABE 4069, 153.8 mm standard length (SL)]; B, *P. vittatus* (ZUMT ABE 2868, 181.4 mm SL), and C, *Pomadasys argenteus* (ZUMT ABE 4071, 118.1 mm SL).

Specimens of the family Istiophoridae (Actinopterygii: Teleostei) deposited in the Department of Zoology, The University Museum, The University of Tokyo

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Abstract

A list of specimens of Istiophoridae deposited in the Department of Zoology, The University Museum, The University of Tokyo (ZUMT) is provided. However, no specimens were found of Xiphiidae, which together with Istiophoridae comprise the superfamily Xiphioidea. Judging from the ZUMT ledger and ZUMT specimens located during this study indicated that 72.7% of istiophorid specimens originally registered in ZUMT were present, the remainder being lost. The latter includes the holotype of *Tetrapturus angustirostris* Tanaka, 1915, described from a ZUMT specimen collected from Funakata, Tateyama City, Chiba Pref.

Introduction

The billfishes, including marlins and sailfish, in the family Istiophoridae includes at least five genera and nine species (Collette et al. 2006). Among them, four genera and five species have been recorded from Japanese waters (Nakabo and Doiuchi 2013). All species are fished and marketed circumglobally, and are also popular as sport fishing targets (Nakamura 1997a, b, 2001b, 2002, 2016; Hata and Motomura 2015). Although the family is similar to Xiphiidae (swordfishes) in sharing a maxilla extending like a sword, the former is characterized by a long pelvic fin (vs. pelvic fin absent in Xiphiidae), and two keels on the caudal peduncle (vs. a single keel) (Nakamura 2001a, b). Xiphioidea, a superfamily including Istiophoridae and Xiphiidae, has long been considered related to Scombroidei (e.g., Matsubara 1955; Johnson 1986; Nakabo and Doiuchi 2013). However, recent molecular phylogenetic studies have shown that the superfamily is more closely related to Menidae, Nematistiidae, and Carangidae (Mirande 2016; Rabosky et al. 2018; Girard et al. 2020).

During a survey of the fish collection held in the Department of Zoology, The University Museum, The University of Tokyo (ZUMT), eight istiophorid specimens plus several additional registrations of Istiophoridae were found. A list of the specimens is provided below.

Materials and Methods

The specimens of Istiophoridae in the Department of Zoology, The University Museum, The University of Tokyo (abbreviated as ZUMT) were identified during the present study, following Nakamura et al. (1968), Nakamura (1983, 1985, 2001b) and Nakabo and Doiuchi (2013), with the species classification following Collette et al. (2006). Each specimen-lot contained a single specimen. Parentheses following registration numbers include [(body length (in mm; measured from tip of lower jaw to end of middle caudal-fin rays); collection locality; collection date; collector (if available)]. The ZUMT specimens listed herein are stored in Room 406 (specimen storage room), in the museum building (as of Dec. 2021).

Collection of Istiophoridae in ZUMT

Eight specimens of a single istiophorid species, *Istiophorus platypterus* (Shaw, 1792), collected widely from the Pacific coast of southern Japan and off Shimane Pref., were confirmed in the ZUMT collection. However, according to the ZUMT ledgers, 11 specimens were registered as かじき or かぢき (“Kajiki”, Japanese name for istiophorid species), or under generic names included in the family by Nakamura (1983, 1985). Therefore, more than 25% of specimens originally registered have been lost (72.7% remaining). Furthermore, because many ledger entries refer to lot numbers only (lacking species names), it is suggested that even more ZUMT specimens have been lost. Although all species in the family Istiophoridae attain up to 2 m total length, with larger individuals frequently caught and landed in Japan (Nakamura et al. 1968; Nakamura 1983, 1985, 2001b; Miura 2012; Hata 2018, 2020), all of the istiophorid specimens observed in this study were juveniles (< 70 cm body length). Although other larger individuals may not have been collected in the first place, due to physical restrictions due to their size, Tanaka’s (1915) holotype of *Tetrapturus angustirostris* Tanaka, 1915 (ZUMT 4187, 2000 mm total length) was also not found. In fact, it is highly likely that most (if not all) of the missing registered individuals were large specimens. In addition, no ZUMT specimens or ZUMT ledger registrations of examples of Xiphiidae were found.

Species account

Family Istiophoridae マカジキ科

Istiophorus platypterus (Shaw, 1792) バシヨウカジキ

ZUMT 4428 (98.5 mm; Uchiura, Numazu City, Shizuoka Pref., Japan; coll. by T. Aoki)

ZUMT 18644 (259.4 mm; Kashiwa-jima Island, Otsuki Town, Kochi Pref., Japan; Aug. 1928; coll. by T. Kamohara)

ZUMT 20541 (154.4 mm; Wakayama Pref., Japan; Jan. 1920)

ZUMT 26220 (339.8 mm; Goza, Shima City, Mie Pref., Japan; coll. by Y. Ozaki)

ZUMT 31182 [approx. 607 mm (cut into two pieces); Matsue City, Shimane Pref., Japan; donated by R. Yanai (Matsue High School)]

ZUMT 31668 [(215.6 mm; probably collected from Ibaraki Pref., Japan; donated by K. Tashiro (Ibaraki Prefectural Fisheries Experimental Center)]

ZUMT 40295 (112.4 mm; Misaki, Miura City, Kanagawa Pref., Japan)
ZUMT 63357 (75.7 mm; probably collected from Misaki, Miura City, Kanagawa Pref., Japan;
1916; coll. by K. Aoki)

Specimens recorded in the ZUMT specimen ledger, but not found

ZUMT 3875 (as *Istiophorus* sp.; caught in Funakata, Tateyama City, Chiba Pref., Japan and obtained at Tokyo Market, Tokyo Met., Japan)
ZUMT 4187 (holotype of *Tetrapturus angustirostris* Tanaka, 1915; Funakata, Tateyama City, Chiba Pref., Japan)
ZUMT 5890 [as *Istiophorus orientalis* (currently regarded as a junior synonym of *I. platypterus*; Nakamura 1983, 1985), バシヨオカヂキ; Misaki, Miura City, Kanagawa Pref., Japan; 1894; coll. by K. Aoki]

Acknowledgements

We are deeply grateful to the late Y. Tominaga for his dedication and efforts to the ZUMT collection. We thank I. Abe, S. Fujiwara, A. Inuma, M. Saito, A. Takahashi, H. Ogata and other volunteers for the opportunity to examine the present specimens and providing curatorial assistance. We also thank G. Hardy (Ngunguru, New Zealand), who read the manuscript and provided help with English. This study was supported in part by the Sasakawa Scientific Research Grant from the Japan Science Society (28-745, 2021-4064); a Grant-in-Aid from the Japan Society for the Promotion of Science for JSPS Fellows (DC2: 29-6652); JSPS KAKENHI Grant Numbers 19K23691 and 21K06313JP.

References

- Collette, B. B., McDowell, J. R. and Graves, J. E. 2006. Phylogeny of recent billfishes (Xiphioidae). *Bulletin of Marine Science*, 79 (3): 455–468.
- Girard, M. G., Davis, M. P. and Smith, W. L. 2020. The phylogeny of carangiform fishes: morphological and genomic investigations of a new fish clade. *Copeia*, 108 (2): 265–298.
- Hata, H. 2018. *Istiophorus platypterus* (Shaw, 1792). P. 417. In: Koeda, K., Hata, H., Yamada, M. and Motomura, H. (eds) Field guide to fishes landed at Uchinoura Fishing Port, Kagoshima, Japan. The Kagoshima University Museum, Kagoshima. (In Japanese)
- Hata, H. 2020. *Istiophorus platypterus* (Shaw, 1792). P. 491. In: Koeda, K., Hata, H., Yamada, M. and Motomura, H. (eds) Fishes from markets in Osumi Peninsula, Kagoshima, Japan. The Kagoshima University Museum, Kagoshima. (In Japanese)
- Hata, H. and Motomura, H. 2015. First record of *Tetrapturus angustirostris* (Perciformes: Istiophoridae) from the Ryukyu Islands on the basis of the collected specimen. *Nature of Kagoshima*, 41: 153–156. (In Japanese)
- Johnson, G. D. 1986. Scombroid phylogeny: an alternative hypothesis. *Bulletin of Marine Science*, 39 (1):1–41.
- Matsubara, K. 1955. Fish morphology and hierarchy. Parts I–III. Ishizaki Shoten, Tokyo. xi + 1605 pp., 135 pls. (In Japanese)

- Mirande, J. M. 2016. Combined phylogeny of ray-finned fishes (Actinopterygii) and the use of morphological characters in large-scale analyses. *Cladistics*, 33: 333–350.
- Miura, N. 2012. Fishes at Chinen Market, Okinawa. Wave Kikaku, Yonabaru. 140 pp. (In Japanese)
- Nakabo, T. and Doiuchi, R. 2013. Istiophoridae, billfishes. Pp. 1633–1634, 2218–2219. In: Nakabo, T. (ed) Fishes of Japan with pictorial keys to the species third edition. Tokai University, Press, Hadano. (In Japanese)
- Nakamura, I. 1983. Systematics of the billfishes (Xiphiidae and Istiophoridae). *Publications of the Seto Marine Biological Laboratory*, 28 (5/6): 255–396.
- Nakamura, I. 1985. FAO species catalogue. Vol. 5. Billfishes of the world. An annotated and illustrated catalogue of marlins, sailfishes, spearfishes and swordfishes known to date. FAO Fisheries Synopsis, No. 125, 5: i–iv + 1–65.
- Nakamura, I. 1997a. Istiophoridae. P. 661. In: Okamura, O. and Amaoka, K. (eds) Sea fishes of Japan. Yama-kei Publishers, Tokyo. (In Japanese)
- Nakamura, I. 1997b. *Makaira indica*. P. 661. In: Okamura, O. and Amaoka, K. (eds) Sea fishes of Japan. Yama-kei Publishers, Tokyo. (In Japanese)
- Nakamura, I. 2001a. Xiphiidae, swordfishes. Pp. 3757–3758. In: K. E. Carpenter and Niem, V. H. (eds) FAO species identification guide for fishery purposes. The living marine resources of the western central Pacific, vol. 6, no. 4. FAO, Rome.
- Nakamura, I. 2001b. Istiophoridae, billfishes. Pp. 3759–3764. In: K. E. Carpenter and Niem, V. H. (eds) FAO species identification guide for fishery purposes. The living marine resources of the western central Pacific, vol. 6, no. 4. FAO, Rome.
- Nakamura, I. 2002. Istiophoridae, billfishes. Pp. 1860–1866 In: Carpenter, K. E. (ed), FAO species identification guide for fishery purposes and American Society of Ichthyologists and Herpetologists Special Publication no. 5. The living marine resources of the western central Atlantic. Vol. 3. Bony fishes part 2 (Opisthognathidae to Molidae), sea turtles and marine mammals. FAO, Rome.
- Nakamura, I. 2016. Istiophoridae, billfishes (spearfishes, marlins and sailfishes). Pp. 2938–2945 In: Carpenter, K. E. and De Angelis, N. (eds) FAO species identification guide for fishery purposes. The living marine resources of the eastern central Atlantic. Vol. 4. Bony fishes part 2 (Perciformes to Tetraodontiformes). FAO, Rome.
- Nakamura, I., Iwai, T., Matsubara, K. 1968. A review of the sailfish, spearfish, marlin and swordfish of the world. *Misaki Marine Biological Institute Kyoto University Special Report*, 4: 1–95. (In Japanese)
- Rabosky, D. L., Chang, J., Title, P. O., Cowman, P. F., Sallan, L., Friedman, M., Kaschner, K., Garilao, C., Near, T. J., Coll, M. and Alfaro, M. E. 2018. An inverse latitudinal gradient in speciation rate for marine fishes. *Nature*, 559: 392–395.
- Tanaka, S. 1915. Figures and descriptions of the fishes of Japan including Riukiu Islands, Bonin Islands, Formosa, Kurile Islands, Korea and southern Sakhalin. V. 19: 319–342, pls. 91–95.

Report on Gerreidae specimens (Teleostei: Perciformes) deposited in the Department of Zoology, The University Museum, The University of Tokyo, with notes on *Gerres* cf. *chrysops* from Sarawak, Borneo

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Abstract

The collection of Gerreidae (Teleostei: Perciformes) held in the Department of Zoology, The University Museum, The University of Tokyo (ZUMT) includes 156 specimens representing two genera and eight species, most of which were collected in the early 20th century, but does not include type specimens of nominal species in the family. A single specimen from Sarawak, Borneo (88.4 mm standard length; SL) agreed well with the morphological characters of *Gerres chrysops* Iwatsuki, Kimura & Yoshino, 1999, previously recorded only from northeastern Gulf of Thailand, in having the following characters: IX, 10 dorsal-fin rays; 12 gill rakers on the first gill arch; body depths at the pelvic fin and anal fin origins 47.0 % of SL and 39.4 % of SL, respectively; interorbital width 12.1% of SL; caudal-peduncle depth 13.6% of SL; and 2 supraneurals. However, the specimen differed slightly from the type specimens of *G. chrysops* in having 17 pectoral-fin rays (vs. 16 in the latter), and 10.5 scale rows below the lateral line (vs. 8.5–9.5). Although the former may yet prove to be an undescribed species, any judgment must be based on additional specimens and comparative materials. A single specimen of *Gerres equulus* Temminck & Schlegel, 1844 from Fukushima Prefecture represents the first record of this species from the Tohoku region.

Introduction

The silverbiddy family Gerreidae (Teleostei: Perciformes), currently represented by seven valid genera and 54 valid species in tropical to temperate waters in the Indo-Pacific and Atlantic (Fricke et al. 2021), is characterized by the following characters: body laterally compressed, oblong, oval, or with markedly elevated back; mouth terminal, strongly protractile, pointing downward when extended; bands of acute minute teeth in both jaws; incisors, canines and molars absent; dorsal fin long, single, with 9 (occasionally 10) spines, the first very short (except in *Parequula*), and a similar number of soft rays (9–11 in *Deckertichthys*, *Diapterus*, *Eucinostomus*, *Eugerres* and *Gerres*) or greater (12–15 in *Pentaprion* and 16–18 in *Parequula*); base of dorsal fin sheathed in a row of deciduous scales; anal fin usually with III spines (very

rarely II), but V or VI in *Pentaprion*, the first spine very short in all species, except *Parequula*; 6–8 anal-fin rays (but 12–14 in *Pentaprion* and 14–18 in *Parequula*); pectoral fins long and pointed; caudal fin markedly to very deeply forked; scales large, deciduous, cycloid or finely ctenoid, extending over sides of head (Roux 1986; Deckert and Greenfield 1987; Woodland 2001; Gilmore and Greenfield 2003; Iwatsuki et al. 2012; Vergara-Solana et al. 2014). Most species, except deepwater species in the genus *Parequula*, inhabit shallow sandy or muddy bottoms in coastal waters, feeding on small bottom invertebrates by taking up mouthfuls of substrate, and expelling sand and debris (Woodland 2001; Iwatsuki et al. 2012).

The family has long been confused taxonomically due to the similar overall appearance, coloration, and meristics of species (Woodland 1986; Iwatsuki et al. 1999a). However, recent studies have resolved many of the issues, with the recognition of some Indo-Pacific species complexes (Iwatsuki et al. 1996, 1998, 1999a, b, 2001a, b, c, 2002, 2007, 2012; Iwatsuki and Kimura 1998; Iwatsuki and Heemstra 2001, 2007).

During the management of the fish collection in the Department of Zoology, The University Museum, The University of Tokyo (ZUMT), 156 specimens were identified by the first author as belonging to the family Gerreidae. They are listed below with morphological and distributional notes.

Materials and Methods

Identifications of the gerreid specimens in ZUMT were confirmed by the first author, with reference to Iwatsuki et al. (1996, 1998, 1999a, b, 2001a, b, c, 2002, 2007, 2012), Iwatsuki and Kimura (1998), Iwatsuki and Heemstra (2001, 2007), and Woodland (2001). Standard lengths (SL) were measured for all specimens, which are arranged herein in alphabetical order by species. Although, some of the ZUMT specimens collected by Tokiharu Abe (阿部宗明) had not been formally cataloged into the ZUMT collection (and the data of some specimens not retained), such specimens are listed herein with the number ZUMT ABE-XXXX (number written on the accompanying label), due to the possibility of future discovery of Dr. Abe's remaining catalog books with collection data. Local name, and collector's name and affiliation are given where known (from ZUMT specimen catalog or tag), with Japanese language equivalents in parentheses. The following list includes ZUMT number, SL, number of specimens in parentheses when two or more, type (abbreviated when non-type), collection locality, collection date, collector or donator and affiliation, collection method, and remarks when applicable.

Collection of Gerreidae in ZUMT

Two genera and eight species of the family Gerreidae are represented by 156 specimens held in ZUMT, there being no type specimens of any nominal species. Specimens were collected from 1909 to 1960, many representing subtropical or tropical species from the Ryukyu Archipelago, and the tropical Indo-West Pacific. Most specimens from waters off Kyushu and Honshu were identified as *Gerres equulus* Temminck & Schlegel, 1844, the most commonly caught species (by set net, seine net, and line-fishing) in temperate Japanese coastal areas (Iwatsuki et al. 1999a; Shimose 2018; Hata 2020). Other common species inhabiting temperate Japanese waters, *Gerres japonicus* Bleeker, 1854 and *Gerres akazakii* Iwatsuki,

Kimura & Yoshino, 2007 were not found in the collection, due to their preferred estuarine habitat (Iwatsuki et al. 2007). Consequently, they are rarely collected by set nets and/or gill nets on rocky reefs, the most common methods of collecting coastal fish specimens in Japan.

Gerreidae クロサギ科

Gerres Quoy & Gaimard, 1824 クロサギ属

Gerres cf. chrysops Iwatsuki, Kimura & Yoshino, 1999

(Fig. 1)

ZUMT 62506 (paper tag P. 611): 88.4 mm SL, probably around Sarawak, donated in 1960 by Tom Harrison (Sarawak Museum) to I. Tomiyama (富山一郎).

Remarks: The specimen from Sarawak belongs to the *Gerres setifer* complex sensu Iwatsuki et al. (2001a), in having a deep body (depth at pelvic fin origin 47.0% of SL) and two supraneural bones (Fig. 1). Moreover, it agreed well with the morphological characters of *Gerres chrysops*, previously recorded only from northeastern Gulf of Thailand, having the following features: IX, 10 dorsal-fin rays; 12 gill rakers on first gill arch; body depth at anal fin origin 39.4 % of SL; interorbital width 12.1% of SL; and caudal-peduncle depth 13.6% of SL (Fig. 1; Iwatsuki et al. 1999b). However, the specimen differed slightly from the type specimens of *G. chrysops* in having 17 pectoral-fin rays (vs. 16 in the latter) and 10.5 scale rows below the lateral line (vs. 8.5–9.5), and is likely to represent an undescribed species, due to the currently recognized species in the *G. setifer* complex having a limited distribution (Iwatsuki et al. 1999b, 2001a). However, additional specimens and comparative materials are required before any taxonomic conclusions are made (currently under study by H.W.).

Since the *G. setifer* complex is currently known only Bengal and Thailand bays, Malay Peninsula, Xisha Archipelago, the southwestern Eurasian coast from Amoy to Guanghai, and Taiwan, the present specimen probably represents the first record of the complex from Borneo.

Gerres equulus Temminck & Schlegel, 1844 クロサギ

ZUMT 2320: 144.9 mm SL, Nagasaki, Japan, 11 July 1909.

ZUMT 2658: 107.2 mm SL, Nagasaki, Japan, Feb. 1910, Nagasaki Prefecture Normal School (長崎師範学校), local name “Inoko (イノコ)”.

ZUMT 3654 (cloth tag Hamamatsu “濱松”): 57.0 mm SL, Hamamatsu (浜松), Shizuoka, Japan, T. Saito (斎藤智治)

ZUMT 3880: 77.5 mm SL, Kajiki (加治木), Kagoshima, Japan, Y. Tashiro, Kajiki Junior High School (加治木中学校 田代善太郎).

ZUMT 6402: 157.3 mm SL, Nagasaki, Japan, K. Kaneko (金子一狼).

ZUMT 7741: 57.4 mm SL, Ise-yokkaichi (currently probably “Yokkaichi (四日市市)”), Mie, Japan, M. Kobayashi, Ise-yokkaichi Elementary School (伊勢四日市第一小学校 小林万作).

- ZUMT 7915:** 181.1 mm SL, Shimanokuni-Momotori (志摩国桃取), currently Toba (鳥羽市), Mie, Japan, O. Taniguchi (谷口織平).
- ZUMT 18402:** 165.0 mm SL, Misaki (三崎), Miura, Kanagawa, Japan, K. Aoki (青木熊吉).
- ZUMT 20209:** 167.1 mm SL, Kisyu-tanabe (紀州田辺), Wakayama, Japan, Jan. 1920, N. Ui (宇井縫蔵).
- ZUMT 21698:** 182.3 mm SL, Tokyo Market.
- ZUMT 22586:** 32.0 mm SL, Kisyu-tanabe, Wakayama, Japan, Jan. 1920, N. Ui.
- ZUMT 23778:** 84.7 mm SL; **ZUMT 23779:** 98.7 mm SL; **ZUMT 23780:** 87.3 mm SL; **ZUMT 23781:** 60.7 mm SL; **ZUMT 23782:** 94.4 mm SL; **ZUMT 24095:** 69.3 mm SL, Taniyama (谷山), Kagoshima, Japan, 20 July 1930, local name "Amenoiwo (アメノイワ)".
- ZUMT 23960:** 105.4 mm SL; **ZUMT 24143:** 75.8 mm SL, Naya (納屋) [currently Nakamachi and Kinsei-cho (中町・金生町)], Kagoshima City, Kagoshima, Japan, local name "Amenoiwo (アメノイワ)".
- Remarks: Naya Street (facing the sea) was established in 1615 (early Edo era) by Iehisa Shimazu (島津家久), at that time Lord of Satsuma Province, to serve as a fish market. It was considered as a major fish market in Kagoshima City until 1935, when the market was moved to Jonan, Kagoshima City (Naya Street Shopping Street Promotion Association 2021; Ixrea 2021). The area is currently inland due to land reclamation.
- ZUMT 26879:** 125.2 mm SL; **ZUMT 40487:** 87.7 mm SL; **ZUMT 40493:** 72.1 mm SL; **ZUMT 40494:** 78.8 mm SL, Kagoshima, Japan.
- ZUMT 30081:** 209.2 mm SL, Hayama (葉山), Miura, Kanagawa, Japan, Aug. 1934.
- ZUMT 34101:** 16.5 mm SL, Onahama, Iwaki, Fukushima, Japan, H. Kakuta (角田春彦).
- ZUMT 43580:** 37.2 mm SL, Nagasaki, Japan, Feb. 1912.
- ZUMT 49205:** 127.9 mm SL, Misaki (三崎), Miura, Kanagawa, Japan, 6 Feb. 1958, I. Tomiyama.
- ZUMT 49964:** 155.7 mm SL, Fukue-jima I. (福江島), Goto Is. (五島列島), Nagasaki, Japan, 10 June 1953, I. Tomiyama (Fukue-cho Fish. Corp.) (福江町漁業共同組合).
- ZUMT 50037:** 190.9 mm SL, Mitsuiraku (三井楽), Fukue-jima I., Goto Is., Nagasaki, Japan, 13 Oct. 1953, I. Tomiyama (Mitsuiraku-cho Fish. Corp.) (三井楽町漁業共同組合), Local name "Guchi (グチ)" or "Shindobari (シンドバリ)".
- ZUMT 50190:** 118.9 mm SL; **ZUMT 50191:** 135.5 mm SL; **ZUMT 50192:** 131.2 mm SL; **ZUMT 50193:** 131.3 mm SL, Arikawa (有川), Nakadori-jima I. (中通島), Goto Is., Nagasaki, Japan, 18 Oct. 1953, I. Tomiyama (Arikawa-cho Fish. Corp.) (有川町漁業共同組合).
- ZUMT 52144:** 127.1 mm SL, Totoro (土々呂), Nobeoka (延岡), Miyazaki, Japan, Aug. 1960.
- ZUMT 62403** (cloth tag "Feb. 28. '68 福魚市"): catalog number newly given during this study, 204.0 mm SL, probably Fukuoka Fish Market, 28 Feb. 1968.
- ZUMT 62405:** 123.4 mm SL **ZUMT 62405:** 123.4 mm SL; **ZUMT 62406:** 123.4 mm SL; **ZUMT 62407:** 120.5 mm SL; **ZUMT 62412:** 78.6 mm SL; **ZUMT 62413:** 84.6 mm SL; **ZUMT 62414:** 60.3 mm SL; **ZUMT 62415:** 54.4 mm SL; **ZUMT 62416:** 46.7 mm SL; **ZUMT 62417:** 40.3 mm SL; **ZUMT 62421:** 50.9 mm SL, catalog numbers newly given during this study, localities and dates unknown.

ZUMT 62429 (cloth tag "332 アマギ VIII'32 MMB.S アベ". MMB.S probably refers to Misaki Marine Biological Station: School of Science, The University of Tokyo): catalog number newly given during this study, 79.3 mm SL, locality unknown, Aug. 1932, T. Abe (阿部宗明).

ZUMT ABE 11002: 125.9 mm SL; **ZUMT ABE '60-1026**: 111.2 mm SL; **ZUMT ABE '60-1027**: 110.3 mm SL; **ZUMT ABE '60-1028**: 106.5 mm SL; **ZUMT ABE '60-1029**: 96.7 mm SL, locality and date unknown, T. Abe.

Remarks: The distribution of *G. equulus* in Japan in the early to mid-20th century, as judged from these specimens, was not significantly different from the current distribution (Iwatsuki et al. 1999a; Hatooka 2013). In Japanese waters, *G. equulus* has been recorded from Chiba to Kagoshima prefectures on the Pacific coast, Niigata to Yamaguchi prefectures on the Sea of Japan coast, Nagasaki to Kagoshima prefectures on the East China Sea coast, Tokyo, Osaka and Kagoshima bays, the Seto Inland Sea, and Tsushima, Sadogashima, Tanegashima and Yaku-shima islands (Seto Inland Sea Fishery Development Council 1997; Iwatsuki et al. 1999a; Omi et al. 2003; Hatooka 2013; Takeuchi et al. 2015; Kaburagi 2016; Matsunuma et al. 2016; Motomura and Harazaki 2017; Arao et al. 2020; Hata 2020).

A single juvenile specimen from Fukushima Prefecture (ZUMT 34101, 16.5 mm SL) represents the first record of the species from Pacific Coast of the Tohoku region. Since warm water fishes are sometimes accidentally transported northward to the southern Tohoku region by Kuroshio Follow-on (黒潮続流), the usually eastward-flowing branch from east of Boso Peninsula occasionally flows northward along the east coast of the peninsula (Kume et al. 2017), this individual was probably an example of such, possibly transported from south of Chiba Prefecture during the egg or larval stage.

Gerres erythrourus (Bloch, 1791) セダカクロサギ

ZUMT 14756: 123.2 mm SL, Yaeyama Is. (八重山諸島), Ryukyu Archipelago (琉球列島), Okinawa, Japan, H. Yashiro (沖縄県産業課 屋代弘孝).

ZUMT 40898: 120.9 mm SL; **ZUMT 40908**: 86.1 mm SL, Jolo I., Sulu Archipelago, Philippines, Feb. 1909, I. Iijima (飯島 魁) and K. Aoki.

ZUMT 41993: 100.3 mm SL; **ZUMT 41994**: 89.1 mm SL; **ZUMT 41995**: 106.1 mm SL; **ZUMT 41996**: 86.2 mm SL; **ZUMT 41997**: 117.3 mm SL; **ZUMT 41998**: 88.7 mm SL; **ZUMT 41999**: 80.8 mm SL, Philippines, Jan. 1938, U. Yamamura (山村樸次郎).

ZUMT 42277: 80.6 mm SL, Philippines, 1926, U. Yamamura.

Gerres filamentosus Cuvier, 1829 イトヒキサギ

ZUMT 14899: 99.3 mm SL; **ZUMT 14900**: 97.4 mm SL; **ZUMT 14901**: 99.4 mm SL, Taiwan, T. Aoki (青木赳雄).

ZUMT 62402 (cloth tag Palao 49): catalog number newly given during this study, 87.4 mm SL, Palau.
ZUMT 62403 (cloth tag "169 ヒイラギ 3 月 31 日 '31 年 淡水市場"): 142.8 mm SL, Tansui (淡水), New Taipei City (台北), Taiwan, 31 Mar. 1931, purchased at Tansui Market.
ZUMT ABE 3374: 93.4 mm SL; **ZUMT ABE 3376**: 103.5 mm SL; **ZUMT ABE 3453**: 97.0 mm SL; **ZUMT ABE 3697**: 86.4 mm SL, Palau, T. Abe.
ZUMT 62401: 60.0 mm SL; **ZUMT 62418**: 142.2 mm SL; **ZUMT 62419**: 120.4 mm SL; **ZUMT 62420**: 94.5 mm SL; **ZUMT 63059**: 93.7 mm SL; **ZUMT 63288**: 39.4 mm SL; **ZUMT 63289**: 40.3 mm SL, catalog numbers newly given during this study, localities and dates unknown.

Gerres longirostris (Lacepède, 1801) ツツパリサギ

ZUMT 55304: 72.7 mm SL, Palau, Aug. 1935, Y. Haneda, Yokosuka City Museum (横須賀市立博物館 羽根田弥太).
ZUMT 63358 (cloth tag Palao 44): catalog number newly given during this study, 67.3 mm SL, Palau.
ZUMT ABE 3456: 79.9 mm SL; **ZUMT ABE 3456**: 79.9 mm SL; **ZUMT ABE 3465**: 86.0 mm SL; **ZUMT ABE 3454**: 94.8 mm SL; **ZUMT ABE 3455**: 86.4 mm SL; **ZUMT ABE 3457**: 93.9 mm SL; **ZUMT ABE 3458**: 99.2 mm SL; **ZUMT ABE 3459**: 98.3 mm SL; **ZUMT ABE 3460**: 89.9 mm SL; **ZUMT ABE 3461**: 100.0 mm SL, Palau, 1936, T. Abe.

Gerres oyena (Forsskål, 1775) ミナミクロサギ

ZUMT 14067: 151.9 mm SL; **ZUMT 14068**: 139.0 mm SL; **ZUMT 14069**: 145.9 mm SL; **ZUMT 14070**: 140.8 mm SL, Okinawa-jima I., Ryukyu Archipelago, Okinawa, Japan, H. Yashiro.
ZUMT 16775: 80.1 mm SL; **ZUMT 16776**: 119.0 mm SL; **ZUMT 16777**: 73.1 mm SL, Onna (恩納), west of Okinawa-jima I., Ryukyu Archipelago, Okinawa, Japan, S. Tanabe (水産学校漁労科 田辺貞夫).
ZUMT 16832: 68.1 mm SL; **ZUMT 16833** (cloth tag 13 "十三"): 139.7 mm SL, Unten (運天), Nakijin (今帰仁), northwest of Okinawa-jima I., Ryukyu Archipelago, Okinawa, Japan, S. Tanabe.
ZUMT 16954: 92.1 mm SL; **ZUMT 16962**: 97.5 mm SL; **ZUMT 16963**: 82.8 mm SL; **ZUMT 16964** (cloth tag "イセ"): 89.2 mm SL; **ZUMT 16965**: 116.0 mm SL; **ZUMT 17107**: 122.3 mm SL; **ZUMT 17108**: 135.0 mm SL; **ZUMT 17110**: 133.8 mm SL, Itoman (糸満), south of Okinawa-jima I., Ryukyu Archipelago, Okinawa, Japan, S. Tanabe.
ZUMT 17308: 93.6 mm SL, Yaeyama Is., Ryukyu Archipelago, Okinawa, Japan, S. Tanabe.
ZUMT 17390: 76.1 mm SL, Naha (那覇), southwest of Okinawa-jima I., Ryukyu Archipelago, Okinawa, Japan, S. Tanabe and Hiyane (比屋根).
ZUMT 25482: 125.7 mm SL, Philippines, before 12 May 1933, A.W. Herre (Stanford University).

ZUMT 42000: 128.1 mm SL, Philippines, Jan. 1938, U. Yamamura.
ZUMT 53004: 77.3 mm SL; **ZUMT 53006**: 73.3 mm SL; **ZUMT 53009**: 61.7 mm SL; **ZUMT 53010**: 53.4 mm SL; **ZUMT 53011**: 73.9 mm SL, probably east coast of African Continent (catalog entry, "Taki-Africa 4"), probably Taki.
ZUMT 53506: 71.5 mm SL, Ishigaki-jima I.? (石垣島), Yaeyama Is., Ryukyu Archipelago, Okinawa, Japan, probably T. Sato (佐藤寅夫).
Remarks: The specimen supposedly collected from Ishigaki-jima Island (based on the ZUMT specimen ledger) was included in a series with specimens of *Sardinops melanostictus* (Temminck & Schlegel, 1846) (Clupeidae) (ZUMT 53211) and *Pempheris japonica* Döderlein, 1883 (Pempheridae) (ZUMT 53349). Therefore the locality is doubtful.
ZUMT 62426 (cloth tag, No. 4): catalog number newly given during this study, 90.6 mm SL, locality and date unknown.
ZUMT ABE 2325: 118.6 mm SL; **ZUMT ABE 2713**: 169.3 mm SL; **ZUMT ABE 2739**: 123.04 mm SL; **ZUMT ABE 2740**: 125.7 mm SL; **ZUMT ABE 2776**: 152.2 mm SL; **ZUMT ABE 2823**: 146.1 mm SL; **ZUMT ABE 3184**: 77.7 mm SL; **ZUMT ABE 3451**: 171.0 mm SL; **ZUMT ABE 3452**: 111.6 mm SL; **ZUMT ABE 3462**: 91.7 mm SL; **ZUMT ABE 3463**: 86.6 mm SL; **ZUMT ABE 3464**: 61.5 mm SL; **ZUMT ABE 3466**: 92.2 mm SL; **ZUMT ABE 3696**: 67.7 mm SL; **ZUMT ABE 4259**: 167.6 mm SL; **ZUMT ABE 4260**: 160.6 mm SL, Palau, 1936, T. Abe.
ZUMT ABE '60-1319: 131.4 mm SL, **ZUMT ABE '60-1320**: 114.4 mm SL; **ZUMT ABE '61-1035**: 106.0 mm SL, T. Abe, locality and date unknown.

Gerres shima Iwatsuki, Kimura & Yoshino, 2007 シマクロサギ

ZUMT 62408: 83.6 mm SL; **ZUMT 62409**: 113.1 mm SL; **ZUMT 62410**: 85.2 mm SL; **ZUMT 62411**: 82.0 mm SL, catalog numbers newly given during this study, localities and dates unknown.

Pentaprion Bleeker, 1850 タイワンサギ属

Pentaprion longimanus (Cantor, 1849) タイワンサギ

ZUMT 11244: 67.0 mm SL; **ZUMT 11245**: 113.0 mm SL, probably Okinawa-jima I., Ryukyu Archipelago, Okinawa, Japan, S. Sakaguhi, Okinawa Daiichi Junior High School (沖縄県立第一中学校 坂口総一郎).
ZUMT 39749: 122.3 mm SL; **ZUMT 39812**: 121.0 mm SL; **ZUMT 39913**: 111.7 mm SL, probably Okinawa-jima I., Ryukyu Archipelago, Okinawa, Japan, before Mar. 1925, S. Sakaguhi.
ZUMT 40778: 64.6 mm SL, **ZUMT 40802**: 57.0 mm SL, **ZUMT 40822**: 51.5 mm SL, **ZUMT 40823**: 57.5 mm SL, **ZUMT 40879**: 68.6 mm SL, Manila, Philippines, 11 Feb. 1909, I. Iijima and K. Aoki.
ZUMT 51048: 107.4 mm SL, East China Sea, Dec. 1959, bottom trawl.

ZUMT 51216: 100.5 mm SL, Norin Area 554, East China Sea, 20 Jan. 1960, F/V *Ten-yo-maru* (天洋丸).

ZUMT 51406: 102.6 mm SL, East China Sea or Fukuoka Fish Market, Oct. 1959.

ZUMT 54090: 134.9 mm SL, Kuji (久慈), southwest of Amami-oshima I. (奄美大島), Amami Is., Kagoshima, Japan, 20 May 1966, line fishing, donated by local fisherman to Y. Tominaga (富永義昭).

Acknowledgements

We are deeply grateful to the late Y. Tominaga for his dedication and efforts to the ZUMT collection. We are also grateful to H. Hata (National Museum of Nature and Science), I. Abe, S. Fujiwara, A. Inuma, M. Saito, A. Takahashi (Tokyo University of Marine Science and Technology), and H. Ogata (ZUMT) for curatorial assistance. G. S. Hardy (Ngunguru, New Zealand) kindly improved the English in the manuscript. The present study was supported in part by Grant-in-Aid from the Japan Society for the Promotion of Science for JSPS Fellows (PD:21J01755) to the first author, and JSPS KAKENHI 21K06313 JP and the Sasakawa Scientific Research Grant from The Japan Science Society (2021-4064) to the second author.

References

- Arao, K., Motai, K., Ohara, M. and Furota, T. 2020. Ichthyofauna of Yatsu Tidal Flat in the inner Tokyo Bay – II. Natural History Report of Kanagawa, 41: 61–70.
- Deckert, G. D. and Greenfield, D. W. 1987. A review of the western Atlantic species of the genera *Diapterus* and *Eugerres* (Pisces: Gerreidae). *Copeia*, 1987: 182–194.
- Fricke, R., Eschmeyer, W. N., Van der Laan, R. (eds). 2021. Catalog of fishes: genera, species, references.
<http://researcharchive.calacademy.org/research/ichthyology/catalog/fishcatmain.asp>.
Accessed 17 December 2021.
- Gilmore, R. G., Jr. and Greenfield, D. W. 2003. Gerreidae. Mojarra. Pp. 1506–1521. In: Carpenter, K.E. (ed) The living marine resources of the Western Central Atlantic. Volume 3: Bony fishes part 2 (Opistognathidae to Molidae). FAO species identification guide for fishery purposes and American Society of Ichthyologist and Herpetologists Special Publication No. 5. FAO, Rome.
- Hata, H. 2020. Gerreidae. Pp. 350–352. In: Koeda, K., Hata, H., Yamada, M. and Motomura, H. (eds) Fishes from markets in Osumi Peninsula, Kagoshima, Japan. The Kagoshima University Museum, Kagoshima.
- Hatooka, K. 2013. Gerreidae, majarras. Pp. 935–939, 2005–2008. Nakabo, T. (ed) Fishes of Japan with pictorial keys to the species, third edition. Tokai University Press, Hadano. (In Japanese)
- Iwatsuki, Y. and Heemstra, P. C. 2001 *Gerres phaiya*: a new species of gerreid fish (Teleostei: Perciformes: Gerreidae) from India, with comments on *Gerres poieti* and the *Gerres erythrourus* complex. *Copeia*, 2001: 1043–1049.

- Iwatsuki, Y. and Heemstra, P. C. 2007. A new gerreid fish species and redescription of *Gerres maldivensis* Regan, 1902 from the Indian Ocean (Perciformes: Gerreidae). *Copeia*, 2007: 85–92.
- Iwatsuki, Y. and Kimura, S. 1997. *Gerres methueni* Regan, 1920, a senior synonym of *G. rappi* (Barnard, 1927) (Perciformes: Gerreidae). *Ichthyological Research*, 44: 1–7.
- Iwatsuki, Y., Kimura, S. and Yoshino, T. 1996. Validity of the gerreid fish, *Gerres macracanthus* Bleeker, 1854, with designation of a lectotype, and designation of a neotype for *G. filamentosus* Cuvier, 1829. *Ichthyological Research*, 43: 417–429.
- Iwatsuki, Y., Kimura, S. and Yoshino, T. 1998. Redescription of *Gerres erythrourus* (Bloch, 1791), a senior synonym of *G. abbreviatus* Bleeker, 1850 (Teleostei: Perciformes: Gerreidae). *Copeia*, 1998: 165–172.
- Iwatsuki, Y., Kimura, S. and Yoshino, T. 1999b. Description of *Gerres chrysops* sp. nov. from Thailand and redescription of *Gerres setifer* (Hamilton, 1822) and *G. decacanthus* (Bleeker, 1865) (Perciformes: Gerreidae). *Ichthyological Research*, 46: 27–41.
- Iwatsuki, Y., Kimura, S. and Yoshino, T. 1999a. Redescriptions of *Gerres baconensis* (Evermann & Seale, 1907), *G. equulus* (Temminck & Schlegel, 1844) and *G. oyena* (Forsskål, 1775), included in the "*G. oyena* complex", with notes on other related species (Perciformes: Gerreidae). *Ichthyological Research*, 46: 377–395.
- Iwatsuki, Y., Kimura, S. and Yoshino, T. 2001a. New species of *Gerres* from the southern Malay Peninsula, belonging to the *Gerres setifer* complex (Perciformes: Gerreidae). *Copeia*, 2001: 164–168.
- Iwatsuki, Y., Kimura, S. and Yoshino, T. 2001b. Redescription of *Gerres longirostris* (Lacepède, 1801) and *Gerres oblongus* Cuvier in Cuvier and Valenciennes, 1830, included in the *Gerres longirostris* complex (Perciformes: Gerreidae). *Copeia*, 2001: 954–965.
- Iwatsuki, Y., Kimura, S. and Yoshino, T. 2001c. *Gerres limbatus* Cuvier and *G. lucidus* Cuvier from the Indo-Malay Archipelagos, the latter corresponding to young of the former (Perciformes: Gerreidae). *Ichthyological Research*, 48: 307–314.
- Iwatsuki, Y., Kimura, S. and Yoshino, T. 2002. A new species: *Gerres microphthalmus* (Perciformes: Gerreidae) from Japan with notes on limited distribution, included in the "*G. filamentosus* complex". *Ichthyological Research*, 49: 133–139.
- Iwatsuki, Y., Kimura, S. and Yoshino, T. 2007. A review of the *Gerres subfasciatus* complex from the Indo-West Pacific, with three new species (Perciformes: Gerreidae). *Ichthyological Research*, 54: 168–185.
- Iwatsuki, Y., Pogonoski, J. J. and Last, P. R. 2012. Revision of the genus *Parequula* (Pisces: Gerreidae) with a new species from southwestern Australia. *Zootaxa*, 3425: 42–54.
- Ixrea. 2021. Column: When the changing scenery of the city (Part 2). https://www.ixrea.jp/works_topics/211109_column/. Accessed 23 December 2021. (In Japanese)
- Kaburagi, K. 2016. Angling fishes of Tanega-shima island. Tamashida-sha, Nishinoomote. 157 pp. (In Japanese)
- Matsunuma, M., Fukui, Y. and Motomura, H. 2016. Freshwater fishes of Kagoshima City, southern Kyushu, Japan. The Kagoshima University Museum, Kagoshima. 86 pp. (In Japanese)

- Motomura, H. and Harazaki, S. 2017. Annotated checklist of marine and freshwater fishes of Yaku-shima island in the Osumi Islands, Kagoshima, southern Japan, with 129 new records. *Bulletin of the Kagoshima University Museum*, 9: 1–183.
- Naya Street Shopping Street Promotion Association. 2021. History of Naya Street. <https://nayadori.com/history/>. Accessed 23 December 2021. (In Japanese)
- Omi, H., Kusakabe, T. and Nabeshima, Y. 2003. Fishes occurring on artificial beach of southern coast in Osaka Bay. *Bulletin of the Osaka Prefectural Fisheries Experimental Station*, 14: 57–70.
- Roux, C. 1986. Gerreidae. Pp. 325–326. In: Daget, J., Gosse, J.-P. and Thys van den Audenaerde, D. F. E. (eds) Check-list of the freshwater fishes of Africa. CLOFFA. Volume II. ISNB, Bruxelles, MRAC, Tervuren, and ORSTOM, Paris.
- Seto Inland Sea Fishery Development Council. 1997. Fishes of Seto Inland Sea. Seto Inland Sea Fishery Development Council, Kobe. 97 pp. (In Japanese)
- Shimose, T. 2018. Gerreidae. P. 277. In: Nakabo, T. (ed) *The Natural History of the Fishes of Japan*. Shogakukan, Tokyo.
- Takeuchi, N., Senou, H. and Seino, S. 2015. Fish fauna of Tsushima Island, Nagasaki Prefecture, Japan ~ Researches from 1948 to 2015 ~. *Bulletin of the Biogeographical Society of Japan*, 70: 1–11. (In Japanese)
- Vergara-Solana, F. J., García-Rodríguez, F. J., Tavera, J. J., De Luna, E. and De La Cruz-Agüero, J. 2014. Molecular and morphometric systematics of *Diapterus* (Perciformes, Gerreidae). *Zoologica Scripta*, 43:338–350. DOI: 10.1111/zsc.12054.
- Woodland, D. J. 1986. Family No. 194: Gerreidae. Pp. 608–609. In: Smith M. M. and Heemstra, P. C. (eds) *Smiths' Sea Fishes*. Macmillan South Africa, Johannesburg.
- Woodland, D. J. 2001. Family Gerreidae. Mojarras (silverbiddies). Pp. 2946–2960. In: Carpenter, K. E. and Niem, V. H. (eds). *Species identification guide for fishery purposes. The living marine resources of the western central Pacific. Bony fishes part 3 (Menidae to Pomacentridae)*. Volume 5. FAO, Rome.

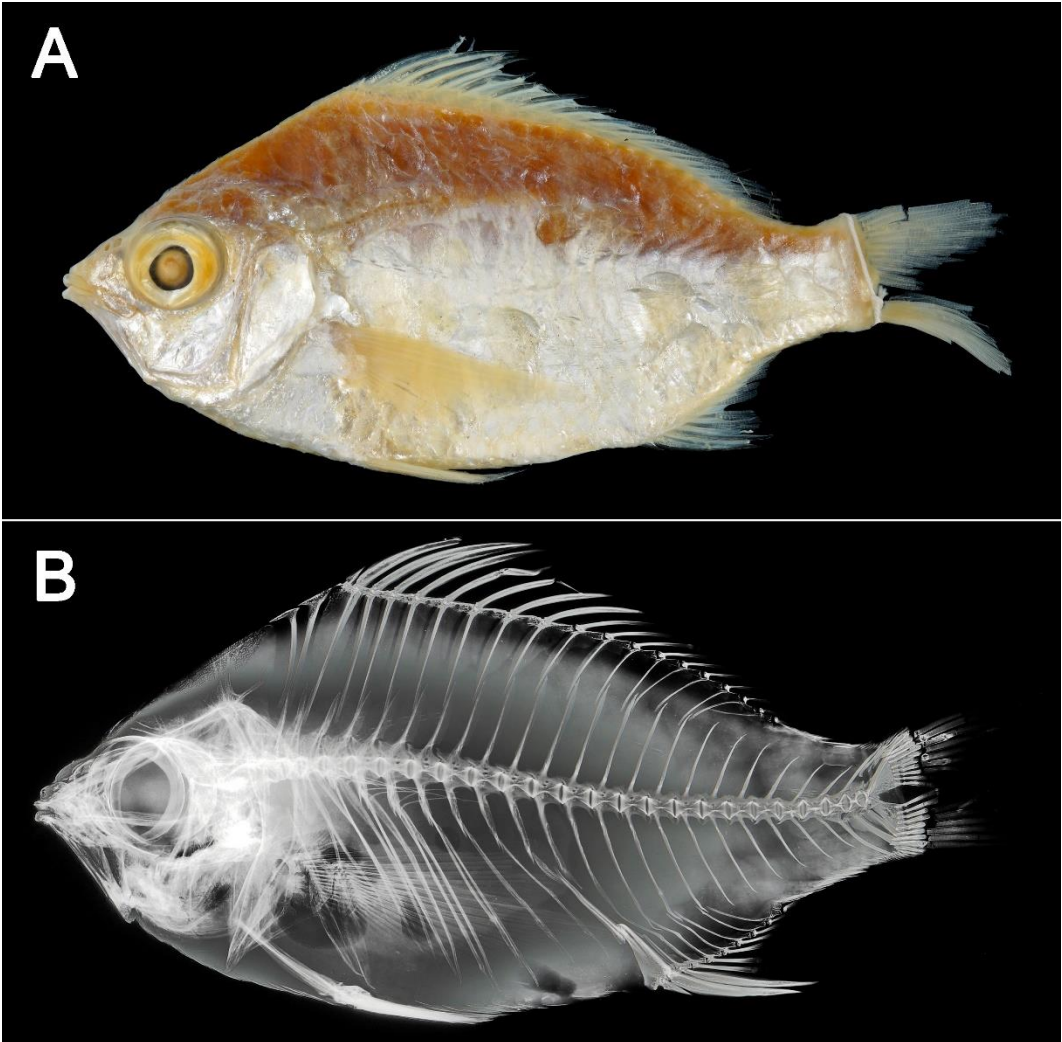


Figure 1. *Gerres* cf. *chrysops* from Sarawak, Borneo (ZUMT 62506, 88.4 mm SL). A: Photograph of preserved specimen (image reversed); B: radiograph.

Fish types deposited in the Department of Zoology, The University Museum, The University of Tokyo - Part 1: Anguilliformes

東京大学総合研究博物館動物部門収蔵の魚類タイプ標本—第1部：ウナギ目

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Abstract

The current status of type specimens of Anguilliformes in the ZUMT collection were investigated with recourse to original descriptions, information tags on specimens, and/or the ZUMT specimen ledger. Of the 11 holotypes, three syntypes, and nine paratypes purported to be in the collection and applicable to 15 species in five families, only seven holotypes and seven paratypes have been located to date.

Introduction

The fish collection, preserved in the Department of Zoology, The University Museum, The University of Tokyo (ZUMT), was established in 1904 by Shigeho Tanaka (1878–1974), a graduate of the Department of Zoology, Faculty of Science, The University of Tokyo. He registered a large number and variety of fish specimens, collected not only by himself or others in the department, but also donated by teachers at junior and senior high schools, fishery experimental station staff, and volunteers from all over Japan, plus many expatriates. The collection and registration of specimens were not necessarily done at the same time, with Ichiro Tomiyama (1906–1981), a student of Tanaka's, being actively involved in the registration of unregistered specimens from around 1935. Subsequently, management of the ZUMT collection was undertaken by Tokiharu Abe (1911–1996), who had also studied under Tanaka, and Yoshiaki Tominaga (1936–1994), who had studied under Ichiro Tomiyama. However, since the mid-1990s, there has been no regular collection manager, the only management input having been from MA and KS, both as volunteers. To date, the ZUMT fish collection comprises about 63,000 specimens, including more than 800 type specimens of 300 species, the majority of which were collected over a period of about 50 years (from the 1890s until Tanaka's retirement in 1939). However, during its more than 100 years of history, the ZUMT collection has lost some of its specimens (including type specimens), due to the Great Kanto Earthquake, the Pacific War, and three re-locations of the collection.

Shigeho Tanaka was the first modern Japanese ichthyologist, describing nearly 170 new species, many in his series "Figures and descriptions of the fishes of Japan including Riukiu

Islands, Bonin Islands, Formosa, Kurile Islands, Korea, and Southern Sakhalin", written in English and Japanese and published between 1911 and 1930, and his series "XX new species of Japanese fishes (in *Dobutsugaku Zasshi* = Zoological Magazine Tokyo)", published between 1915 and 1918. In many cases, the former series clearly designated type specimens, but in the latter, important information, including number of type specimens and identification of primary types, was often not included. Accordingly, the current designation and status of type specimens in the ZUMT collection is now under review. The present list is a summary of Anguilliformes type specimens of Anguilliformes currently held.

ZUMT の魚類コレクションは、1904 年に東京大学理学部動物学科を卒業した田中茂穂 (1878–1974) によって収集が開始された。彼は自身や動物学教室の教員が収集した魚類標本に加えて、日本全国の中学、高校の教員、水産試験場職員、ボランティア、海外駐在員から提供されたさまざまな魚類を ZUMT コレクションに登録した。標本の収集と登録は必ずしも同時に行われたわけではないが、田中の弟子である富山一郎 (1906–1981) を中心として、これら未登録標本の登録作業が 1935 年頃より積極的におこなわれている。その後、ZUMT コレクションの管理と蓄積は、同じく田中に師事した阿部宗明 (1911–1996)、さらに富山一郎に師事した富永義昭 (1969–1994) によって引き継がれてきた。しかしながら、1990 年代中旬以降は正規のコレクション管理者が不在となり、それ以降は第一および第三著者によってボランティアとしてコレクションの管理が続けられている。現在に至るまでに ZUMT コレクションには 800 以上の模式標本 (300 種以上) を含む約 63,000 標本が登録されており、その大部分は 1890 年代から 1939 年に田中が退官するまでの約 50 年間に収集されたものである。ただし、ZUMT コレクションは 100 年以上の歴史のなかで、関東大震災、太平洋戦争、3 度にわたる標本庫の移動などによって標本の一部が失われおり、田中だけでなく、富山や阿部が記載した種も含めてタイプやその他の標本が発見できないこともしばしばある。

田中茂穂は日本において近代的な魚類の研究をおこなった初めの人物であり、生涯に 177 種の新種を記載した。これらのうち 124 種は、1911 年から 1930 年にかけて出版された「日本産魚類図説」ならびに 1915 年から 1918 年にかけて出版された「日本産魚類の〇〇新種 (動物学雑誌)」のなかで記載されている。前者については、タイプ標本と判断できる記載が明示されている場合が多いものの、後者についてはタイプ番号等の情報がなく、どの標本がタイプであるべきか、といった議論がなされないまま今に至る例も多い。本研究では、ZUMT コレクションに収蔵されるタイプ標本の現状について整理するとともに、タイプ指定に関する議論もおこなった。本リストは、ZUMT に含まれるタイプ標本のうちウナギ目魚類についてまとめたものである。

Materials and Methods

The “available” type specimens of Anguilliformes in the ZUMT collection were confirmed by the first author. They are currently stored in room 407 in the museum building. The ZUMT collection also includes a variety of personal specimens acquired by the late Tokiharu Abe, such being identifiable in the first instance by an underlined number on the specimen tag. Although those specimens were at no time registered into the ZUMT collection, they are treated here as ZUMT ABE XXXX.

The systematic arrangement of families generally follows Nelson (2006), with species

arranged in alphabetical order by species name. The present list includes all the available information pertinent to the ZUMT specimens, including that taken from the ZUMT specimen ledger and/or tags on the specimens.

Information from original description: scientific name, publication, Japanese name in the original description.

Current status on types: available or lost.

Information on type specimens: ZUMT catalog number (number of specimens when more than two), field number or previous catalog number if available, sex, preservation status (stuffed or skin only indicated), collection locality, collection date, collector or donator, collection method, typographical error.

Remarks: Authority for determining type status, correction of previously published erroneous information, and newly determined information from specimen registers and tags.

Current status of species: synonyms, current scientific name and standard Japanese name.

Reference: publications cited in remarks or basis for current status. Listed for each species.

第一著者により、ZUMT に所在するウナギ目魚類のタイプ標本が確認された。本タイプリストにおいて確認と示した標本は博物館の 407 号室に保管されている。ZUMT コレクションには、故阿部宗明の個人標本が混在しており、これらは基本的に標本タグに書かれた番号に下線が付されていることで識別可能である。これら阿部氏の標本は、ZUMT コレクションに登録されていないものの、本リストにおいては ZUMT ABE ○○○○として扱った。

科の体系的な順番は、主に Nelson (2006) に従い、種については学名のアルファベット順に示した。本リストでは、ZUMT 標本に基づき（あるいは基づいたと想定される）記載されたウナギ目に関する以下の情報を可能な限り示した。また ZUMT 標本台帳や標本のタグから読み取れる情報についても含めた。

原記載の情報：学名、記載された出版物、記載時に与えられた和名。

タイプ標本の確認状況：確認または未確認。

タイプ標本の情報：ZUMT 番号（複数の場合は標本数）、フィールド番号または寄贈前の他機関登録番号、性別、保存の状態（剥製または皮膚のみの場合に記載）、採集場所、採集年月日、採集者または寄贈者、採集方法など。標本台帳から読み取れる新たな情報についても可能な限り記した。

備考：該当標本をタイプと判断した根拠、ZUMT のタイプ標本が誤って引用された情報、本研究で新たに確認された標本台帳やタグに関する情報、入力ミスなどについて必要に応じて記した。

種の現状：シノニム関係および適用されている学名と標準和名。

引用文献：備考で引用した印刷物や種の現状に関する根拠。種ごとに示した。

Type specimens of Anguilliformes in ZUMT

Based on the original descriptions, tags on the specimens, and the ZUMT specimen ledger, type specimens of 15 species of Anguilliformes in five families, including 11 holotypes, three syntypes, and nine paratypes, were purported to be in the ZUMT collection. Seven holotypes and seven paratypes have been confirmed as “available” to date.

原記載、標本のタグおよび ZUMT 台帳の情報などから ZUMT コレクションに所蔵されるウナギ目魚類標本には 5 科 15 種タイプ標本が登録（あるいは未登録）されていることが明らかになった。その内訳はホロタイプ 11 標本、シンタイプ 3 標本、パラタイプ 9 標本である。本研究において、これらのうち現在 ZUMT に所在することが確認できたものはホロタイプ 7 標本、パラタイプ 7 標本である。

Acknowledgements

We are deeply grateful to the late Y. Tominaga for his dedication and efforts to the ZUMT collection. We are also grateful to H. Hata (National Museum of Nature and Science), I. Abe, S. Fujiwara, A. Inuma, M. Saito, A. Takahashi (Tokyo University of Marine Science and Technology), and H. Ogata (ZUMT) for curatorial assistance. G. S. Hardy (Ngunguru, New Zealand) kindly improved the English in the manuscript. The present study was supported in part by JSPS KAKENHI 21K06313 JP and the Sasakawa Scientific Research Grant from The Japan Science Society (2021-4064) for the second author.

ZUMT コレクションに多大な貢献をされた故富永義明氏に深く感謝する。また、国立科学博物館の畑 晴陵氏、ボランティアの尾形比呂哉氏および東京海洋大学の阿部伊央太氏、藤原咲紀氏、飯沼 藍氏、齋藤 舞氏、高橋あゆみ氏には標本の管理にご助力いただいた。G. S. Hardy 氏 (Ngunguru, New Zealand) には原稿の英文を校閲いただいた。本研究の一部は、第 2 著者への日本学術振興会科研費 21K06313 JP、日本学術振興会笹川科学研究助成金 (2021-4064) の助成を受けた。

Anguilliformes ウナギ目

Anguillidae ウナギ科

Anguilla remifera Jordan & Evermann, 1902

Original description: Jordan and Evermann (1902): 325, fig. 7.

Jordan, D. S. and Evermann, B. W. 1902. Notes on a collection of fishes from the island of Formosa. Proceedings of the United States National Museum, 25 (1289): 315–368.

Holotype (lost): ZUMT uncatalogued, Hokoto [Pengfu], Taiwan.

Remarks: Although the original description states, regarding the type specimen, "One specimen from Hokoto of Formosa, No. 12064 (70), 18.5 inches long, was returned to Imperial University", "No. 12064" was not a ZUMT registration number. Furthermore, no specimens in ZUMT matched the description of the holotype. The collection locality, written as "Hokoto" in the original description (Jordan and Evermann 1902), was believed to be Hokoto [Taipei City] by Ho and Shao (2011). However, "Hokoto" is the Japanese name for the Pengfu Islands, further evidence of the correct locality having been given by Jordan and Evermann (1902), who noted that Hokoto was also referred to as "Pescadores", another name for Pengfu.

原記載では、「One specimen from Hokoto of Formosa, No. 12064 (70), 18.5 inches long, was returned to Imperial University」と記されている。この「標本 No. 12064」は ZUMT コレクションの登録番号ではなく、また、記載に一致するホロタイプとなるべき標本は確認できなかった。原記載に標本の採集場所として書かれている"Hokoto"は、Ho and Shaw (2011)により台北市の"Hokuto"であるとされている。しかし、"Hokoto"は澎湖諸島の日本名であり、Jordan and Evermann (1902)においても"Hokoto"は“Pescadores (=澎湖諸島の別名)”であることが明記されている。

Current status: Synonym of *Anguilla japonica* Temminck & Schlegel, 1846 ニホンウナギ
Ege, V. 1939. A revision of the genus *Anguilla* Shaw. A systematic, phylogenetic and geographical study. Dana Report, 16: 1–257, pls. 1–6.

Ho, H.-C. and Shao, K.-T. 2011. Annotated checklist and type catalog of fish genera and species described from Taiwan. Zootaxa, 2957: 1–74.

Muraenidae ウツボ科

Gymnothorax neglectus Tanaka, 1911 ミゾレウツボ

Original description: Tanaka (1911): 28, pl. 7 (fig. 24).

田中茂穂. 1911. 日本産魚類図説, 2: 19–34, pls. 6–10. (Tanaka, S. 1911. Figures and descriptions of the fishes of Japan including Riukiu Islands, Bonin Islands, Formosa, Kurile Islands, Korea, and Southern Sakhalin, 2: 19–34, pls. 6–10. [In Japanese and English])

Holotype (available): ZUMT 2165, Keelung, Taiwan, collected by Masamitsu Ooshima. (基隆、台湾、大島正満採集)

Remarks: The original description specifies ZUMT 2165 as type. In addition, No. 2165 in the ZUMT specimen ledger was recorded as "*Gymnothorax neglectus* n. sp. Type". The specimen also had two cloth tags - "2165" and "*Gymnothorax neglectus* n. sp. Type". Although Böhlke and Smith (2002: 130) listed the specimen as "NSMT 2165" in their type catalog for Indo-Pacific Muraenidae, the correct catalog number of the holotype is ZUMT 2165.

原記載は ZUMT 2165 をタイプに指定している。ZUMT 標本台帳の 2165 には「*Gymnothorax neglectus* n. sp., Type」と記されており、また、この標本には「2165」と「*Gymnothorax neglectus* n. sp., Type」と書かれた布タグが付いていた。Böhlke and Smith (2002: 130)によるウツボ科のタイプカタログでは、本種のタイプ番号を「NSMT 2165」と誤記されているが、ホロタイプの登録番号は「ZUMT 2165」である。

Current status: Valid as *Gymnothorax neglectus* Tanaka, 1911 ミゾレウツボ

Böhlke, E. B. and Smith, D. G. 2002. Type catalogue of Indo-Pacific Muraenidae. Proceedings of the Academy of Natural Sciences of Philadelphia, 152: 89–172.

Chen, H.-M., Shao, K.-T. and Chen, C.-T. 1994. A review of the muraenid eels (family Muraenidae) from Taiwan with descriptions of twelve new records. Zoological Studies, 3 (1): 44–64.

Gymnothorax nivosus Tanaka, 1918 ミズレウツボ

Original description: Tanaka (1918): 51.

田中茂徳. 1918. 日本産魚類の二新種. 動物学雑誌, 30 (352): 51–52. (Tanaka, S. 1918. Two new species of Japanese fishes. Zoological Magazine Tokyo, 30 (352): 51–52. [In Japanese])

Holotype (lost): ZUMT 8268, Nagasaki Market, Nagasaki Pref., Japan, collected by Ichiro Kaneko. (長崎市場、金子一狼採集)

Remarks: The original description included type specimen information as "total length 820 mm", "Nagasaki market, collected by Ichirou Kaneko", but did not record the specimen registration number. ZUMT 8268 was the only specimen for which the information in the ZUMT specimen ledger matched the scientific name, collection site and collector given in the original description, and was therefore determined to be holotype. Unfortunately, however, that specimen has not been located at this time.

原記載には「全長 820 ミリ」、「長崎市場、金子一狼氏採集」とある。ZUMT 標本台帳に「*Gymnothorax nivosus*, n. sp.」と「金子一狼 (長崎)」と記述された ZUMT 8268 は、学名、採集地と採集者が一致する唯一の標本である。標本 ZUMT 8268 をこの種のアロタイプと判断した。ただし残念ながら、現時点で ZUMT 8628 は確認できない。

Current status: Synonym of *Gymnothorax eurostus* (Abbott, 1860)

Smith, D. G. 2012. A checklist of the moray eels of the world (Teleostei: Anguilliformes: Muraenidae). Zootaxa, 3474: 1–64.

Böhlke, E. B. and Smith, D. G. 2002. Type catalogue of Indo-Pacific Muraenidae. Proceedings of the Academy of Natural Sciences of Philadelphia, 152: 89–172.

Gymnothorax wakanourae Tanaka, 1908

Original description: Tanaka (1908): 24, pl. 2 (fig. 4).

Tanaka, S. 1908. Notes on some Japanese fishes, with descriptions of fourteen new species. Journal of the College of Science. Imperial University, Tokyo, 23 (7): 1–54, pls. 1–4.

Holotype (lost): ZUMT 956, Wakanoura, Wakayama Pref., Kii Penn. Japan, collected by K. Nakanishiki.

Remarks: The original description specified ZUMT 956 as type. However, the ZUMT specimen ledger recorded only the scientific name for No. 956, and the specimen could not be confirmed. Although Böhlke and Smith (2002: 130) listed the specimen as "TIU 956" in their type catalog for Indo-Pacific Muraenidae, the correct catalog number of the holotype is ZUMT 956.

原記載は ZUMT956 をタイプに指定している。ZUMT 標本台帳の ZUMT 956 には学名以外、記述がない。また、現時点で ZUMT 956 は確認できない。Böhlke and Smith (2002: 154)のウツボ科のタイプカタログでは、本種のホロタイプの標本番号が「TIU 956」とされているが、「ZUMT 956」の誤記である。

Current status: Synonym of *Gymnothorax eurostus* (Abbott, 1860)

Böhlke, E. B. and Smith, D. G. 2002. Type catalogue of Indo-Pacific Muraenidae. Proceedings of the Academy of Natural Sciences of Philadelphia, 152: 89–172.

Smith, D. G. 2012. A checklist of the moray eels of the world (Teleostei: Anguilliformes: Muraenidae). Zootaxa, 3474: 1–64.

Gymnothorax ypsilon Hatooka & Randall, 1992 オキノシマウツボ

Original description: Hatooka and Randall (1992): 183, figs. 1–2.

Hatooka, K. and Randall, J. E. 1992. A new moray eel (*Gymnothorax*: Muraenidae) from Japan and Hawaii. Japanese Journal of Ichthyology, 39 (3): 183–190.

Paratypes (available): ZUMT 55591 (1), ZUMT 55594 (1), off Nii-jima Island, Izu Islands (34°26.5' N, 139°10.0' E–34°26.8' N, 139°10.8' E), longline in depths of 120–146 m, collected by Hiroshi Senou, 30 Sept. 1986.

Current status: Valid as *Gymnothorax ypsilon* Hatooka & Randall, 1992 オキノシマウツボ
Smith, D. G. 2012. A checklist of the moray eels of the world (Teleostei: Anguilliformes: Muraenidae). Zootaxa, 3474: 1–64.

Strophidon ui Tanaka, 1918 タケウツボ

Original description: Tanaka (1918): 52.

田中茂穂. 1918. 日本産魚類の二新種. 動物学雑誌, 30 (352): 51–52. (Tanaka, S. 1918. Two new species of Japanese fishes. Zoological Magazine Tokyo, vol. 30 (352): 51–52. [In Japanese])

Holotype (lost): ZUMT uncatalogued, Tanabe, Kii Penn. Japan, collected by Nuizo Ui. (紀伊國田濱 [和歌山県田辺市]、宇井縫蔵採集)

Remarks: No record of this scientific name exists in the ZUMT specimen ledger, nor any supportive information identifying the collection locality or collector. No examples of this species were found in the ZUMT collection.

ZUMT 標本台帳に本種の学名「*Strophidon ui*」や採集場所「紀伊國田濱 [和歌山県田辺市]」、採取者「宇井縫蔵」に関する記述がない。ZUMT コレクションに、この種に該当する標本は確認できなかった。

Current status: Valid as *Strophidon ui* Tanaka, 1918 タケウツボ

Hibino, Y., Satapoomin, U. and Kimura, S. 2017. A new species of the genus *Diaphenchelys* (Anguilliformes: Muraenidae) from Thailand. *Ichthyological Research*, 64 (4): 458–463.

Prokofiev, A. M. 2020. New moray eel species of *Strophidon* genus (Muraenidae) from Vietnam. *Journal of Ichthyology*, 60 (2): 129–134.

Synaphobranchidae

ホラアナゴ科

Gymnosimenchelys leptosomus Tanaka, 1908

Original description: Tanaka (1908): 2, pl. 2 (fig. 2).

Tanaka, S. 1908. Notes on some rare fishes of Japan, with descriptions of two new genera and six new species. *Journal of the College of Science. Imperial University, Tokyo*, 23 (13): 1–24, pls. 1–2.

Syntypes (lost): ZUMT 1855 (3), off Misaki (Sagami Bay), Kanagawa Pref., Japan, depth 600 meters. Japan. Feb. 10, 1902, Collected by Kumakichi Aoki.

Remarks: In the original description, the largest individual (“Sample A”) of three specimens, all registered under “ZUMT 1855”, was designated as “type”. The ZUMT specimen ledger similarly records the three specimens as comprising ZUMT 1855. Accordingly, "Sample A" should be considered as the holotype of the species, and "Samples B and C" as paratypes. However, none of these specimens could be confirmed.

原記載では、3 標本中の最大の個体をタイプに指定し ZUMT 1855 をこれらの登録番号とした。測定表の 3 標本のうち標本 A には「Type」と記され、標本 B と C にはない。ZUMT 標本台帳にも ZUMT 1855 は 3 標本とある。以上のことから、標本 A をホロタイプ、標本 B と C をパラタイプと判断できる。しかし現時点で、ZUMT 1855 の 3 標本は確認できていない。

Current status: Synonym of *Simenchelys parasitica* Gill, 1879 コンゴウアナゴ

Robins, C. H. and Robins, C. R. 1989. Family Synaphobranchidae. Pp. 207–253. In: Böhlke, E. B. (ed) *Fishes of western north Atlantic*, part 9, vol. 1. *Memoirs of the Sears Foundation of Marine Research*, Yale University, New Haven.

Synaphobranchus taketae Tanaka, 1916 オキハモ

Original description: Tanaka (1916): 257.

田中茂穂. 1916. 日本産魚類の二新種. *動物学雑誌*, 28 (333): 257–258. (Tanaka, S. 1916. Two new species of Japanese fishes. *Zoological Magazine Tokyo*, 28 (333): 257–258. [In Japanese])

Holotype (available): ZUMT 55055, Rhikuzen, Miyagi Pref. (?), [640 m (350 hiro) deep; Feb. 1914]; collected by Miyagi Fishery Station. (宮城県水産試験場採集)

Remarks: Although no specimen was recorded with this scientific or common name in the ZUMT specimen ledger, a specimen with two cloth tags - "Miyagi Prefectural Fisheries Experimental Station, Okihamo, 640 m (350 hiro), February 1914" and "Sketch No. 302, Okihamo" – was found amongst the unregistered specimens in ZUMT. This specimen was considered to be the holotype of *Synaphobranchus taketae* Tanaka, 1916, and reregistered as ZUMT 55055, accordingly.

ZUMT 標本台帳には、この学名や和名などに一致する標本はなかった。しかし、未登録標本のなかに「宮城県水産試験場 オキハモ、350 尋 大正四年二月」と「写生番号 302 号、オキハモ」と書かれた 2 つの布タグが付けられた標本があった。この標本を *Synaphobranchus taketae* Tanaka, 1916 のホロタイプと判断し、ZUMT 55055 として登録した。

Current status: Synonym of *Synaphobranchus affinis* Günther, 1877 ホラアナゴ

Robins, C. H. and Robins, C. R. 1989. Family Synaphobranchidae. Pp. 207–253. In: Böhlke, E. B. (ed) Fishes of western north Atlantic, part 9, vol. 1. Memoirs of the Sears Foundation of Marine Research, Yale University, New Haven.

Congridae

アナゴ科

Gorgasia hawaiiensis Randall & Chess, 1980

Original description: Randall and Chess (1980): 19, figs. 1–3.

Randall, J. E. and Chess, J. R. 1980. A new species of garden eel (Congridae: Heterocongrinae) of the genus *Gorgasia* from Hawaii. Pacific Science, 33 (1): 17–23.

Paratypes (available): ZUMT 54065 (1), 100 meters north of Waawaa Point, south of Puako, Kona coast of Hawaii Island, Hawaiian Islands, depth 18 meters, rotenone, collected by Randall, J. E. and Chess, J. R., 10 Aug. 1969.

Current status: Valid as *Gorgasia hawaiiensis* Randall & Chess, 1980

Emily D., Foster, M. S. Rice, M. R., Cailliet, G. M., Yoklavich, M. M. and Hamilton, S. L. 2017. Natural history observations of Hawaiian Garden Eels, *Gorgasia hawaiiensis* (Congridae: Heterocongrinae), from the island of Hawai'i. Pacific Science, 71 (2): 135–147.

Gorgasia japonica Abe, Miki & Asai, 1977 シンジュアナゴ

Original description: Abe et al. (1977a): 1, pl. 1 (fig. 2).

Abe, T., Miki, M. and Asai, M. 1977a. Description of a new garden eel from Japan. UO (Japanese Society of Ichthyologists), 28: 1–8.

Holotype (available): ZUMT 53977, off Utsuki (33°07'31" N, 139°41'18" E), Hachijo-kojima Island, Japan, collected by Makoto Miki and Minoru Asai, 9 May 1976.

Paratypes (available): 4 specimens, ZUMT 53978 (1), ZUMT 53979 (1), ZUMT ABE 17532 (1), ZUMT ABE 17198 (1), same data as holotype.

Remarks: Although the original description of *G. japonica* was based partly on specimens in Abe's personal collection, Abe et al. (1977a) indicated that "Thirteen specimens, 542–990 mm in total length" and "Some of them will be deposited to Rijksmuseum van Natuurlijke Historie, Leiden,... CAS, and a few others if they are willing to receive. Exact date of the specimens and their destination will be mentioned elsewhere in the near future". Abe et al. (1977b) secondly shown the paratypes were transferred to seven institutions as follows: BMNH, BPBM, USNM, ANSP, RMNH, CAS-ICH, SMF. The correspondence between the previous ABE number and the catalog number in each institution are shown as follows: BMNH 1978.4.14.117 [previously ABE 17194] (1), same data as holotype; BPBM 21149 [previously ABE 17533] (1), USNM 218468 [previously ABE 17534] (1), ANSP 139242 [previously ABE 17535] (1), RMNH 27691 [previously ABE 17536] (1), CAS-ICH 40744 [previously ABE 17538] (1), SMF 14310 [previously ABE number unknown] (1), same data as holotype with collection date 10 July 1976. Although the locations of remaining 3 further paratypes from the ABE collection are unknown, one of them is SMF 14310: ABE 17530 (1), ABE 17531 (1), ABE 17537 (1), same data as holotype with collection date 10 July 1976.

Gorgasia japonica の原記載の一部は阿部の個人コレクションに基づいているが、Abe et al. (1977a)は記載のなかで「13 標本、全長 542–990 mm」「それらの標本の一部は Rijksmuseum van Natuurlijke Historie, Leiden や CAS に寄託し、その他は受け取りが可能であれば他の機関に寄託する予定である。」とした。その後、Abe et al. (1977b)はこれらのパラタイプを7つの機関 (BMNH、BPBM、USNM、ANSP、RMNH、CAS-ICH、SMF) に移管したことを示した。これらの元 ABE 標本と移管先機関との対応は以下の通り : MNH 1978.4.14.117 [以前は ABE 17194] (1)、データはホロタイプと同じ; BPBM 21149 [以前は ABE 17533] (1)、USNM 218468 [以前は ABE 17534] (1)、ANSP 139242 [以前は ABE 17535] (1)、RMNH 27691 [以前は ABE 17536] (1)、CAS-ICH 40744 [以前は ABE 17538] (1)、SMF 14310 [ABE 番号は不明] (1)、データはホロタイプと同じ、採集日は 10 July 1976。なお、以下の ABE コレクション 3 標本は所在不明であるが、そのうち 1 標本は SMF 14310 が該当する。ABE 17530 (1)、ABE 17531 (1)、ABE 17537 (1)、データはホロタイプと同じ、採集日は 10 July 197

Current status: Valid as *Gorgasia japonica* Abe, Miki & Asai, 1977 シンジュアナゴ

Abe, T., Sugiura, H. and Nguyen, T.-T. 1977b. Garden eels from Japan. UO (Japanese Society of Ichthyologists), 30: 85–88, pls. II–III.

Shao, K.-T. 1990. Garden eels from Taiwan, with description of a new species. UO (Japanese Society of Ichthyologists), 40: 1–16.

***Gorgasia taiwanensis* Shao, 1990**

Original description: Shao (1990): 4, figs. 2–6.

Shao, K.-T. 1990. Garden eels from Taiwan, with description of a new species. Uo (Japanese Society of Ichthyologists), 40: 1–16.

Paratype (available): ZUMT 56359 [previously ASIZP 056509] (1), Hengchun, southern Taiwan.

Current status: Valid as *Gorgasia taiwanensis* Shao, 1990 アキアナゴ

Abe, T. 1990. Records of the fifth species of Garden eel from Japanese waters. Uo (Japanese Society of Ichthyologists), 40: 17–20.

Ho, H.-C., McCosker, J. E., Smith, D. G. and Shao, K.-T. 2015. Introduction to the systematics and biodiversity of eels (orders Anguilliformes and Saccopharyngiformes) of Taiwan. Zootaxa, 4060 (1): 5–18.

Ophichthidae

ウミヘビ科

***Myrichthys aki* Tanaka, 1917 アキウミヘビ**

Original description: Tanaka (1917): 458, pl. 128 (figs. 358–360).

田中茂穂. 1917. 日本産魚類図説, 26: 455–474, pls. 126–130. (Tanaka, S. 1917. Figures and descriptions of the fishes of Japan including Riukiu Islands, Bonin Islands, Formosa, Kurile Islands, Korea, and Southern Sakhalin, 26: 455–474, pls. 126–130. [In Japanese and English])

Holotype (available): ZUMT 7612, Aki City (Tosa Bay), Kochi Pref., Japan, collected by Syoma Ueta. (土佐國安藝 [安芸市]、上田庄馬採集)

Remarks: The original description designated ZUMT 7612 as “type”, the specimen having two cloth tags - "7612" and "Sketch No. 311". No other specimens in the ZUMT specimen ledger matched this species, and ZUMT 7612 is recognized as the holotype.

原記載は ZUMT 7612 をタイプに指定している。標本には、「7612」と「写生 311 号」の 2 つの布タグが付いている。ZUMT コレクションに、ZUMT 7612 以外に記載に一致する標本はない。

Current status: Synonym of *Myrichthys maculosus* (Cuvier, 1816) モヨウモンガラドオシ
McCosker, J. E. and Rosenblatt R. H. 1993. A revision of the snake eel genus *Myrichthys* (Anguilliformes: Ophichthidae) with the description of a new eastern Pacific species. Proceedings of the California Academy of Sciences, 48 (8): 153–169.

Ophichthus miyamotoi Tanaka, 1913 モヨウウツボ

Original description: Tanaka (1913): 195, pl. 52 (figs. 199–201).

田中茂穂. 1913. 日本産魚類図説, 11: 187–198, pls. 51–55. (Tanaka, S. 1913. Figures and descriptions of the fishes of Japan including Riukiu Islands, Bonin Islands, Formosa, Kurile Islands, Korea, and Southern Sakhalin, 11: 187–198, pls. 51–55. [In Japanese and English])

Holotype (available): ZUMT 2923, Ushuku (presently Ushuku, Kasari), Ooshima (presently Amami-Oshima Island), Kagoshima Pref., Japan. 7 Sept. 1909, collected by Kichizo Miyamoto. (鹿児島県奄美大島宇宿村、明治43年9月7日採集、鹿児島県大島農学校 宮本吉蔵寄贈)

Remarks: The original description designated a single specimen “ZUMT 2923” as holotype. In addition, the notation "*Ophichthus miyamotoi* n. sp." was added to ZUMT 2923 in the ZUMT specimen ledger, in Tanaka’s handwriting.

原記載は1標本 ZUMT2923 をタイプに指定している。ZUMT 標本台帳には、「*Ophichthus miyamotoi* n. sp.」と田中自筆で加筆があった。

Current status: Synonym of *Myrichthys maculosus* (Cuvier, 1816) モヨウモンガラドオン
McCosker, J. E. and Rosenblatt, R. H. 1993. A revision of the snake eel genus *Myrichthys* (Anguilliformes: Ophichthidae) with the description of a new eastern Pacific species. Proceedings of the California Academy of Sciences, 48 (8): 153–169.

Ophichthus roseus Tanaka, 1917 バラヘビウナギ

Original description: Tanaka (1917): 39.

田中茂穂. 1917. 日本産魚類の六新種. 動物学雑誌, 29 (340): 37–40. (Tanaka, S. 1917. Six new species of Japanese fishes. Zoological Magazine Tokyo, 29 (340): 37–40. [In Japanese])

Holotype (available): ZUMT 7485, Tokyo Market, Japan. (東京市場)

Paratype (lost): ZUMT 7486, Tokyo Market, Japan.

Remarks: In the ZUMT specimen ledger, specimens recorded as ZUMT 7485 and ZUMT 7486 had scientific names and collection areas matching the original description. In addition, ZUMT 7485 was annotated “Type” in Tanaka’s handwriting. That specimen is therefore considered to be the holotype, and ZUMT 7486, the paratype. Unfortunately, the latter has not been located at this time. Tanaka (1927) later redescribed and illustrated the holotype of this species as *Ophichthus urolophus* (Temminck & Schlegel, 1846).

ZUMT 標本台帳には原記載の情報と学名および産地が一致した標本「ZUMT 7485、7486」の連番があり、ここには田中直筆で「7458 Type」の加筆があった。このため ZUMT 7485 をホロタイプ、ZUMT 7486 をパラタイプと判断した。ただし、残念ながらパラタイプ ZUMT 7486 は確認できていない。田中 (1927) は本種と本種のホロタイプを *Ophichthus urolophus* (Temminck and Schlegel) として報告している。

Current status: Synonym of *Ophichthus urolophus* (Temminck & Schlegel, 1846) ソソウミヘビ

田中茂穂. 1927. 日本産魚類図説, 41: 785–808, pls. 170–171. (Tanaka, S. 1927. Figures and descriptions of the fishes of Japan including Riukiu Islands, Bonin Islands, Formosa, Kurile Islands, Korea, and Southern Sakhalin, 41: 785–808, pls. 170–171. [In Japanese and English])

McCosker, J. E. 1977. The osteology, classification, and relationships of the eel family Ophichthidae. Proceedings of the California Academy of Sciences (Series 4), 41 (1): 1–123.

Sphagebranchus cinctus Tanaka, 1908

Original description: Tanaka (1908): 4, pl. 1 (figs. 4a–b).

Tanaka, S. 1908. Notes on some rare fishes of Japan, with descriptions of two new genera and six new species. Journal of the College of Science. Imperial University, Tokyo, 23 (13): 1–24, pls. 1–2.

Holotype (available, in poor condition): ZUMT 1547, Ishigaki-jima Island, Okinawa Pref., Japan, collected by G. Ogawa.

Remarks: In the original description, a single specimen ZUMT 1547 was designated as holotype. In the ZUMT specimen ledger, the entry for ZUMT 1547 was annotated "*Sphagebranchus cinctus* n. sp. Type" in Tanaka's handwriting.

原記載は、1 標本 ZUMT 1547 をタイプに指定している。ZUMT 標本台帳の ZUMT 1547 には、「*Sphagebranchus cinctus* n. sp. Type」と田中直筆の加筆があった。

Current status: Synonym of *Leiuranus semicinctus* (Lay & Bennett, 1839) ソラウミヘビ