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Eight new records of marine fishes (Teleostei: Perciformes and Tetraodontiformes) from the Philippines

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Abstract

Thirty-one individuals of seven Perciform and one Tetraodontiform fish species were reported from the Davao Gulf constituting new records for the Philippines: from the Labridae, *Bodianus leucosticticus* (9 individuals) and *Bodianus masudai* (3); Nemipteridae, *Parasclopsis melanophrys* (2); Priacanthidae, *Pristigenys meyeri* (2); Serranidae, *Odontanthias chrysostictus* (6), *Odontanthias randalli* (5) and *Liopropoma latifasciatum* (3); Monacanthidae, *Thamnaconus multilineatus* (1). Large range extensions were found for *P. melanophrys*, *O. chrysostictus*, *O. randalli* and *T. multilineatus*. The individuals of *P. melanophrys* are the third and fourth ever-reported individuals of this extremely rare dwarf monocle bream. A new maximum SL of 126 mm was reported for *O. chrysostictus*. We also encountered one individual of the rare wrasse *Bodianus rubrisos* recently observed at a more northern location. The current observations extend our knowledge of marine fishes in the Philippines and the unusually high marine biodiversity in this region. As all recorded species are considered inhabitants of mesophotic coral ecosystems, these observations also confirm that fishing pressure has increased in these deeper habitats.

Introduction

Biodiversity is unusually high in the archipelagos of south-east Asia and scientists have recognized a biogeographic area, referred to as the Coral Triangle, with the highest marine biodiversity in the world (Hoeksema, 2007). Indonesia, Papua New Guinea and the Philippines cover more than 90% of the Coral Triangle's surface area, and within the Coral Triangle, the Philippines are the centre for species diversity of marine fishes (Carpenter & Springer, 2005). The authors calculated that the central Philippines has the highest fish diversity in the region with, at that time, as many as 1736 marine fish species. New records of fishes, however, have continuously increased that number (Bucol & Alcala, 2014; Motomura *et al.*, 2017; Saceda-Cardoza & Bos, 2017) especially in the southern Philippines, where little marine research has been conducted. Recent studies have reported new fish records (Bos & Gumanao, 2013; Bos & Smits, 2013) and new species descriptions (Motomura *et al.*, 2001; Bos, 2014; Carpenter *et al.*, 2017) have further enriched our knowledge of marine fish biodiversity in the southern Philippines. Moreover, overfishing in shallow coral reefs (Nañola *et al.*, 2011) may have locally shifted fishing pressure to deeper mesophotic coral ecosystems, partly explaining the increasing number of new records of mesophotic fishes (Rocha *et al.*, 2018; Pinheiro *et al.*, 2019).

The present study contributes to the growing knowledge of marine fish biodiversity in the Philippines by reporting eight species for the first time and providing information about their biogeographic distributions and range extensions.

Materials and methods

Local fish markets in Davao City, Panabo City and Tagum City along the coast of the Davao Gulf, Philippines (see map in Bos *et al.*, 2008) have regularly been visited between May 2017 and June 2020. Fish were purchased and measured fresh at the laboratory of the Davao del Norte State College in Panabo City. Standard (SL), Fork (FL) and Total Length (TL) were determined at 1 mm accuracy using a measuring board and individuals were weighed on an electronic scale with an accuracy of 1 g. Subsequently, specimens were preserved and added to the collection of the research museum of the Davao del Norte State College.

For identification purposes, meristic traits were counted and, if necessary, additional body measures were taken to determine species-specific morphometrics (e.g. Randall & Kulbicki, 2006). FishBase (Froese & Pauly, 2021) was used for initial identifications and fish family and/or genus specific literature (provided below) was used for final confirmation of identifications.



Results

Thirty-one individuals of nine fish species, previously unknown from Philippine seas, were found at fish markets along the coast of the Davao Gulf between May 2017 and June 2020. These include seven species belonging to the Labridae, Nemipteridae, Priacanthidae and Serranidae (Perciformes; [Figure 1](#)), and a filefish belonging to the Monacanthidae (Tetraodontiformes; [Figure 2](#)). Individual length and weight measurements are provided in [Table 1](#).

Two individuals of the wrasse *Bodianus leucosticticus* (Bennett, 1832) (Labridae) were encountered at the Panabo market on 17 August 2018 and 20 August 2018 respectively ([Figure 1a](#)). Additionally, seven individuals were found at the Panabo market on 19–23 June 2020. The colour of this fish is dorsally red and ventrally white. The head has a purplish brown appearance. The body is covered with accentuated red dots and interrupted stripes. The base, as well as the tissue between the spines of the dorsal fin, show rows of black dots and some faint yellow blotches (Gomon, 2006). Standard length ranged from 101–135 mm ([Table 1](#)). Selected meristic counts: Dorsal fin XII,10 and Anal fin III,12–13.

Three individuals of the wrasse *Bodianus masudai* Araga and Yoshino, 1975 (Labridae) were encountered at the Panabo market on 5 July 2020 ([Figure 1b](#)). This species can be recognized by three red stripes radiating from the snout, through the eye, over the entire body. The lower stripe marks the centre of the body, while the upper stripe follows the dorsal edge of the body. The two areas in between the stripes are yellowish. The ventral side of the body is white. This species has a conspicuous black blotch at the posterior edge of the operculum. The dorsal is mostly red with a white margin, while the anal fin has a white base, a red stripe and a white margin. The caudal fin is entirely red with posteriorly a narrow white margin. The pelvic fin has a dark, almost black, tip and the pectoral fin is transparent (Gomon, 2006). The standard length ranged from 112–125 mm ([Table 1](#)). Selected meristic counts: Dorsal fin XII,10 and Anal fin III,12.

Although encountered once at a more northern location in the Philippines (Pinheiro et al., 2019), we report one individual of the rare wrasse *Bodianus rubrisos* Gomon, 2006 (Labridae) that was encountered at the Panabo fish market on 15 August 2018 ([Figure 1c](#)); not considered a new record for the current paper. This species can be recognized by the relatively pointed snout. The dorsal part of the body is bright red, while the ventral part is white. The red colour consists of multiple lines running from the eye to the tail with three main lines appearing as disconnected elongated blotches. The caudal and dorsal fins are entirely red, while the dorsal fin base and the proximal band of the dorsal fin have scattered black dots. The base of the pectoral fin has a conspicuous red mark. Selected meristic counts: Dorsal fin XII,10 and Anal fin III,12.

Two individuals of *Parascolopsis melanophrys* Russell & Chin, 1996 (Nemipteridae) constitute a first record for the Philippines. One individual was found at the Sasa market, Davao City, on 31 May 2017 ([Figure 1d](#)) and a second individual was found at the Panabo market on 5 July 2020. The dorsal side of this species is rosy pink and becomes lighter toward the ventral side. It has a mid-lateral yellow stripe from above the pectoral fin towards the caudal peduncle merging into the yellowish caudal tail. Two conspicuous black blotches mark the forehead just dorsal-posterior to the eyes and are disconnected at the sagittal plane. The bases of the anal and the pelvic fins appear sulphur yellow. Standard length ranged from 116–130 mm ([Table 1](#)). Selected meristic counts: Dorsal fin X,9, Anal fin III,7 and 35 lateral line scales.

Two individuals of *Pristigenys meyeri* (Günther, 1872) (Priacanthidae) were encountered at the markets in Panabo City

and Tagum City on 23 January 2018 and 27 May 2018, respectively ([Figure 1e](#)). This bigeye species has up to 11 narrow red bars on the head and body, with irregular red spots and markings between the bars. Furthermore, the head is covered with irregular red spots and lines. The margins on the soft dorsal, caudal, anal and pelvic fins are black. Standard length ranged from 231–238 mm ([Table 1](#)). Selected meristic counts: Dorsal fin X,13, Anal fin III,12 and 33–34 lateral line scales.

Three individuals of *Liopropoma latifasciatum* (Tanaka, 1922) (Serranidae: Liopropomatinae) were found at the Panabo market on 16 August 2018 (1 individual) and 20 June 2020 (2 individuals). This basslet is mostly pink in colour with the anterior sections of the anal and second dorsal fins yellow ([Figure 1f](#)). Also, the upper and lower edges of the caudal tail are yellow. A brown stripe runs laterally through the eye along the body midline to the caudal peduncle. Standard length ranged from 115–144 mm ([Table 1](#)). Selected meristic counts: Dorsal fin XIII,13, Anal fin III,9 and 52 lateral line scales.

Six individuals of *Odontanthias chrysostrictus* (Günther, 1872) (Serranidae: Anthiinae) were encountered at the Tagum market on 30 June 2017 ([Figure 1g](#)). This species is recognized by a compressed body with entirely pink background colour. It has bright yellow spots on most dorsal body scales. The nape is mostly yellow and has a yellow stripe from the snout, below eye to the base of pectoral fin and faintly visible on the pectoral fin. The dorsal spines are pink with yellow interconnecting membranes, while the soft dorsal fin is yellow with scattered pink spots along its base. The third dorsal ray is highly extended. Anal spines are pink with some yellow blotch on the tissue around the first couple of anal rays. The caudal fin is bright yellow with pink edges formed by the upper and lower rays. Standard length ranged from 89–126 mm ([Table 1](#)), with 126 mm being the largest standard length ever recorded. Selected meristic counts: Dorsal fin X,15–16 and Anal fin III,7.

Five individuals of *Odontanthias randalli* White, 2011 (Serranidae: Anthiinae) were found at the Panabo market between 22 June and 5 July 2020 ([Figure 1h](#)). This species is recognized by conspicuous colouration in sulphurous yellow and pink. Two yellow lines run from the snout through the eye and along the upper jaw both ending at the edge of the operculum. The third spine of the dorsal fin is elongated, whereas the third ray has a long yellow filament. The dorsal fin is yellow anteriorly with a pink margin. The posterior part of most body scales is yellow causing a spotted appearance. The anal and pelvic fins have an anterior yellow line. The base of the caudal tail is yellow connecting to yellow upper and lower rays. Standard length ranged from 93–115 mm ([Table 1](#)). Selected meristic counts: Dorsal fin X,16 and Anal fin III,7.

One individual of the filefish *Thamnaconus multilineatus* (Tanaka, 1918) (Tetraodontiformes: Monacanthidae) was found at the Panabo market on 13 June 2020 ([Figure 2](#)). This fish has a blue-grey colour with mostly parallel brown-yellow lines marking the ventral part of the body and radiating from the snout and the eye to the caudal peduncle. The dorsal, caudal and anal fins are transparent with a touch of yellow. Selected meristic counts: Dorsal fin rays 31 and Anal fin rays 31.

Discussion

The eight new records for the Philippines presented in this paper were all found in fish markets along the coast of the Davao Gulf in the southern Philippines, an area that has not received as much scientific attention as other regions in the archipelago. The nine reported species are inhabitants of mesophotic coral ecosystems and, despite some having large biogeographic distribution areas, may have gone largely unnoticed and are considered uncommon

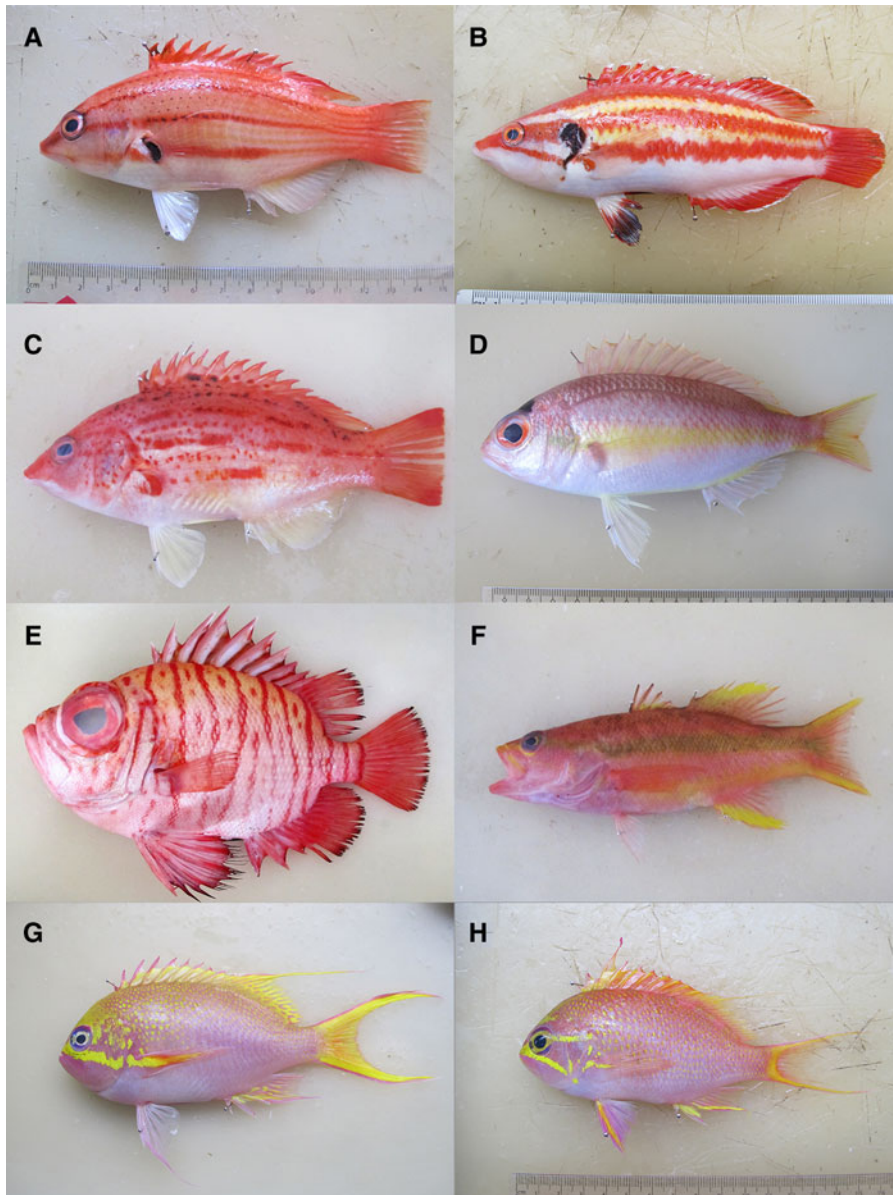


Fig. 1. New records of Perciform fishes from the Philippines (a) *Bodianus leucosticticus* (SL 134 mm), (b) *Bodianus masudai* (SL 125 mm), (c) *Bodianus rubrisos* (SL 124 mm; reported once from the Philippines), (d) *Parascalopsis melanophrys* (SL 130 mm), (e) *Pristigenys meyeri* (SL 231 mm) (f) *Liopropoma latifasciatum* (SL 156 mm) (g) *Odontanthias chrysostictus* (SL 126 mm) (h) *Odontanthias randalli* (SL 104 mm).

in the Indo-Pacific region (Pinheiro *et al.*, 2019). Due to lack of population data, the Red List of Threatened Species categorizes them into 'Least Concern' or does not provide a conservation status at all (IUCN, 2020), which may not correctly represent the



Fig. 2. New record of a Tetraodontiform fish from the Philippines; *Thamnocoenus multileneatus* (SL 133 mm).

actual status of their populations. Mesophotic fishes are usually not found at depths shallower than 30 m and may neither be encountered by divers using regular scuba equipment nor be found on fish markets. However, due to overfishing in shallow coral reefs (Nañola *et al.*, 2011), fishermen may target deeper fish communities, causing mesophotic species to appear more frequently on markets (Pinheiro *et al.*, 2019).

Bodianus leucosticticus occurs in two seemingly isolated populations with one in the Western Indian Ocean (Somalia, Mozambique, Mauritius, Réunion) and the other population in Taiwan and south of Japan (Gomon, 2006; Froese & Pauly, 2021). Gomon (2006) already predicted that this species will likely turn up at intermediate locations. The present observation constitutes the first record of *B. leucosticticus* in the Philippines and extends the biogeographic range of the Indo-Pacific population. Similarly, as for *B. leucosticticus*, *B. masudai* seemingly occurs in two Indo-Pacific populations; a northern population in Japan, Taiwan, and a southern population near New Caledonia (Gomon, 2006). The currently observed individuals most probably belong to the northern population. *Bodianus rubrisos* has been reported from Japan, Taiwan and Bali, Indonesia (Gomon, 2006) and recently from the Philippines (Pinheiro *et al.*, 2019).

Table 1. Standard, Fork, Total Length (mm) and wet weight (g) of eight newly recorded fishes from the Philippines found at local fish markets in Davao City and Davao del Norte province between May 2017 and July 2020

Family	Species	Length (mm)			Weight (g)
		Standard	Fork	Total	
Labridae	<i>Bodianus leucosticticus</i>	101	-	122	32
	<i>Bodianus leucosticticus</i>	120	-	143	56
	<i>Bodianus leucosticticus</i>	121	-	145	56
	<i>Bodianus leucosticticus</i>	124	-	140	50
	<i>Bodianus leucosticticus</i>	131	-	154	73
	<i>Bodianus leucosticticus</i>	132	-	156	66
	<i>Bodianus leucosticticus</i>	132	-	156	66
	<i>Bodianus leucosticticus</i>	134	-	154	72
	<i>Bodianus leucosticticus</i>	135	-	155	74
Labridae	<i>Bodianus masudai</i>	112	-	136	33
	<i>Bodianus masudai</i>	118	-	140	36
	<i>Bodianus masudai</i>	125	-	150	47
Labridae	<i>Bodianus rubrisos</i> ^a	124	-	154	68
Nemipteridae	<i>Parascolopsis melanophrys</i>	116	132	140	44
	<i>Parascolopsis melanophrys</i>	130	151	162	71
Priacanthidae	<i>Pristigenys meyeri</i>	231	-	281	788
	<i>Pristigenys meyeri</i>	238	-	298	900
Serranidae	<i>Liopropoma latifasciatum</i>	115	130	143	38
	<i>Liopropoma latifasciatum</i>	122	141	151	48
	<i>Liopropoma latifasciatum</i>	144	164	180	83
Serranidae	<i>Odontanthias chrysostictus</i>	89	104	127	27
	<i>Odontanthias chrysostictus</i>	91	103	131	31
	<i>Odontanthias chrysostictus</i>	97	116	154	39
	<i>Odontanthias chrysostictus</i>	113	131	169	59
	<i>Odontanthias chrysostictus</i>	121	140	191	69
	<i>Odontanthias chrysostictus</i>	126 ^b	144	197	75
Serranidae	<i>Odontanthias randalli</i>	93	96	140	28
	<i>Odontanthias randalli</i>	102	116	142	44
	<i>Odontanthias randalli</i>	104	119	145	45
	<i>Odontanthias randalli</i>	105	122	175	44
	<i>Odontanthias randalli</i>	115	129	170	55
Monacanthidae	<i>Thamnaconus multilineatus</i>	133	161	167	67

Data are presented per fish family of the Perciformes (4 families) and the Tetraodontiformes (1 family).

^aRecently reported from a more northern location in the Philippines (Pinheiro *et al.*, 2019).

^bNewly reported maximum Standard Length.

The current record confirms a relatively large biogeographic distribution area.

Parascolopsis melanophrys is an extremely rare, yet conspicuous, fish that was reported once from West-Timor in Indonesia and once from Sabah in Malaysia (Russell & Chin, 1996). The present observations constitute the third and fourth individuals ever reported as well as the first record from the Philippines. The present record from the Davao Gulf extends the biogeographic range of *P. melanophrys* by 1940 km to the north and 920 km to the east. The individuals reported here were slightly smaller than the two type specimens (Russell & Chin, 1996).

Pristigenys meyeri occurs in isolated populations in the Western Pacific: thus far recorded from Japan, South China Sea,

Sulawesi, New Guinea and Samoa (Froese & Pauly, 2021). It is considered a reef-associated species, but commonly appears at a depth range of 100–200 m (Fricke *et al.*, 2011). The present observation constitutes the first record of *Pristigenys meyeri* in the Philippines, but does not extend the known biogeographic distribution of this species.

Liopropoma latifasciatum has a biogeographic range in the western Indo-Pacific from Japan to Korea and Taiwan (Shen, 1993). The present observation constitutes the first official record of *Liopropoma latifasciatum* from the Philippines and supports the report of the presence of this species in Palau (Myers, 1999).

So far, *Odontanthias chrysostictus* has only been reported from Manado, Sulawesi in Indonesia (Randall & Heemstra, 2006). The

present observation constitutes the first record from the Philippines extending its biogeographic range by 630 km northward. Two of the six individuals were larger (Table 1) than the earlier reported maximum SL of 118 mm (Randall & Heemstra, 2006). *Odontanthias randalli* has only been reported from Lombok, Indonesia (Froese & Pauly, 2021) and the current observation extends the biogeographic range of this species by 2000 km northward.

Thamnaconus multilineatus is only known from Japan and Taiwan (Masuda *et al.*, 1984). The current observation therefore extends the biogeographic range of this fish by 1800 km to the south. The observed individual was relatively small (Table 1) compared with the reported standard length of up to 260 mm (Masuda *et al.*, 1984).

Reporting of new species records is of utmost importance to understand marine biodiversity and changing distribution patterns possibly occurring over time. Furthermore, this information is needed to improve fisheries and population management, and to support conservation efforts, especially in the fragile mesophotic ecosystems where the reported fishes dwell (Rocha *et al.*, 2018). The current observations of eight new records of fishes extend our knowledge of fish biodiversity in the Philippines and further underline the exceptionally high marine biodiversity in the Coral Triangle.

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Author contributions.

GSG – fieldwork, lab work, analysis, writing; KJSG – fieldwork, lab work; ARB – fieldwork, lab work, analysis, writing. The authors read and approved the final manuscript.

Ethical standards. All fish were purchased at local fish markets in the Philippines.

Availability of data and materials. The collected fishes are available as preserved specimens in the museum of the Davao del Norte State College, Panabo City, the Philippines.

References

- Bos AR (2014) *Upeneus nigromarginatus*, a new species of goatfish (Perciformes: Mullidae) from the Philippines. *Raffles Bulletin of Zoology* **62**, 745–753.
- Bos AR and Gumanao GS (2013) Seven new records of fishes (Teleostei: Perciformes) from coral reefs and pelagic habitats in Southern Mindanao, the Philippines. *Marine Biodiversity Records* **6**, 1–6.
- Bos AR, Gumanao GS, Alipoyo JCE and Cardona LT (2008) Population dynamics, reproduction and growth of the Indo-Pacific horned sea star, *Protoreaster nodosus* (Echinodermata; Asteroidea). *Marine Biology* **156**, 55–63.
- Bos AR and Smits HM (2013) First record of the dottyback *Manonichthys alleni* (Teleostei: Perciformes: Pseudochromidae) from the Philippines. *Marine Biodiversity Records* **6**, 1–2.
- Bucol A and Alcalá AC (2014) Additions to the marine fish fauna of the Philippines. *The Philippine Scientist* **52**, 27–39.
- Carpenter KE and Springer VG (2005) The center of the center of marine shore fish biodiversity: the Philippine Islands. *Environmental Biology of Fishes* **72**, 467–480.
- Carpenter KE, Williams JT and Santos MD (2017) *Acanthurus albimientus*, a new species of surgeonfish (Acanthuriformes: Acanthuridae) from Northeastern Luzon Philippines with comments on zoogeography. *Journal of Ocean Science* **25**, 33–46.
- Fricke R, Kulbicki M and Wantiez L (2011) Checklist of the fishes of New Caledonia, and their distribution in the Southwest Pacific Ocean (Pisces). *Stuttgarter Beiträge zur Naturkunde A. Neue Serie* **4**, 341–463.
- Froese R and Pauly D (2021) FishBase. FishBase consortium. Available at <http://www.fishbase.org>.
- Gomon MF (2006) A revision of the labrid fish genus *Bodianus* with descriptions of eight new species. *Records of the Australian Museum, Supplement* **30**, 1–133.
- Hoeksema BW (2007) Delineation of the Indo-Malayan centre of maximum marine biodiversity: the coral triangle. In Renema W (ed.), *Biogeography, Time, and Place: Distributions, Barriers, and Islands*. New York, NY: Springer, pp. 117–178.
- IUCN (2020) *The IUCN Red List of Threatened Species*. Version 2017-3. Available at <http://www.iucnredlist.org>.
- Masuda H, Amaoka K, Araga C, Uyeno T and Yoshino T (1984) *The Fishes of the Japanese Archipelago*, vol. 1. Tokyo: Tokai University Press, 437 pp.
- Motomura H, Alama UB, Muto N, Babaran RP and Ishikawa S (2017) *Commercial and Bycatch Market Fishes of Panay Island, Republic of the Philippines*. Kagoshima: The Kagoshima University Museum, 246 pp.
- Motomura H, Okamoto M and Iwatsuki Y (2001) Description of a new species of threadfin (Teleostei: Perciformes: Polynemidae), *Polydactylus longipes*, from Mindanao Island, Philippines. *Copeia* **4**, 1087–1092.
- Myers RF (1999) *Micronesian Reef Fishes: A Comprehensive Guide to the Coral Reef Fishes of Micronesia*, 3rd Revised and Expanded Edition. Barrigada, Guam: Coral Graphics, 330 pp.
- Nañola CL, Aliño PM and Carpenter KE (2011) Exploitation-related reef fish species richness depletion in the epicenter of marine biodiversity. *Environmental Biology of Fishes* **90**, 405–420.
- Pinheiro HT, Shepherd B, Castillo C, Abesamis RA, Copus JM, Pyle RL, Greene BD, Coleman RR, Whitton RK, Thillainath E and Bucol AA (2019) Deep reef fishes in the world's epicenter of marine biodiversity. *Coral Reefs* **38**, 985–995.
- Randall JE and Heemstra PC (2006) Review of the Indo-Pacific fishes of the genus *Odontanthias* (Serranidae: Anthiinae), with descriptions of two new species and a related genus. *Indo-Pacific Fishes* **38**, 1–32.
- Randall JE and Kulbicki M (2006) A review of the goatfishes of the genus *Upeneus* (Perciformes: Mullidae) from New Caledonia and the Chesterfield Bank, with a new species and four new records. *Zoological Studies* **45**, 298–307.
- Rocha LA, Pinheiro HT, Shepherd B, Papastamatiou YP, Luiz OJ, Pyle RL and Bongaerts P (2018) Mesophotic coral ecosystems are threatened and ecologically distinct from shallow water reefs. *Science (New York, N.Y.)* **361**, 281–284.
- Russell BC and Chin PK (1996) *Parascalopsis melanophrys*, a new species of dwarf monocle bream (Teleostei: Nemipteridae) from the Indo-Malayan Archipelago. *Raffles Bulletin of Zoology* **44**, 415–418.
- Saceda-Cardoza MM and Bos AR (2017) First record of the rare anthiine *Meganthias kingyo* (Kon, Yoshino & Sakurai, 2000) (Serranidae) from the Philippines. *Journal of Applied Ichthyology* **33**, 813–814.
- Shen SC (1993) *Fishes of Taiwan*. Taipei: Department of Zoology, National Taiwan University, 960 pp.
- White WT (2011) *Odontanthias randalli* n. sp., a new anthiine fish (Serranidae: Anthiinae) from Indonesia. *Zootaxa* **3015**, 21–28.