

An update to the list of coral reef fishes from Koh Tao, Gulf of Thailand

Patrick Scaps^{1*} and Chad Scott²

¹ Laboratoire de Biologie animale, Université des Sciences et Technologies de Lille, 59 655 Villeneuve d'Ascq Cédex, France.

² New Heaven Reef Conservation Program, 48 Moo 3, Koh Tao, Suratthani, Thailand, 84360.

* Corresponding author: E-mail: patrick.scaps@univ-lille1.fr

ABSTRACT: Twenty-one species are reported for the first time from Koh Tao (Turtle Island) in the Gulf of Thailand. Information and photographs were obtained from local scuba divers in order to census rare (*i.e.*, cryptic species or transient species only present during one season) or not previously recorded fish species living on or near coral reefs from the area. This is the first time that species belonging to the families Antennariidae (genera *Antennatus* and *Histrio*), Ophichthyidae (genus *Callechelys*), Platycephalidae (genus *Thysanophrys*), Plotosidae (genus *Plotosus*) and Synanceiidae (genera *Imimicus* and *Synanceia*), and reef-fish genera of several families (*Pseudobalistes*, Balistidae; *Cyclichthys*, Diodontidae; *Bolbometopon*, Scaridae; and *Hippocampus*, Syngnathidae), among others, have been recorded in Koh Tao. Of the 21 species reported for the first time from Koh Tao, 7 species (*Antennatus nummifer* (Antennariidae), *Pseudobalistes marginatus* (Balistidae), *Monacanthus chinensis* (Monacanthidae), *Callechelys marmorata* (Ophichthyidae), *Thysanophrys cf. chiltonae* (Platycephalidae), *Bolbometopon muricatum* (Scaridae) and *Synanceia cf. verrucosa* (Synanceiidae)) are new records for the Gulf of Thailand. To date, 223 species of coral reef fishes belonging to 53 families are known from Koh Tao, including the species found in the present study.

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INTRODUCTION

Koh Tao is a 19 km² island located in the Samui archipelago in the western Gulf of Thailand. The island is relatively remote and distant from the mainland, located 72 km from Chumphon City to the west and 115 km from Suratthani city to the south (Figure 1). The island economy is based largely on scuba diving and reef related tourism, receiving between 300,000–400,000 visitors per year (Larpnurn *et al.* 2011). Koh Tao is a granitic island surrounded by fringing reefs and isolated pinnacles consisting principally of granite and boulder formations on which coral grow. As the fish fauna around Koh Tao has been extensively studied (Satapoomin 2000; Scaps 2006), the goal of this study was to obtain information about rare (*i.e.*, cryptic species or species only present during one season, “transient forms”) or species not yet recorded locally by questioning local scuba divers and obtaining photographs in order to augment the previous work.

Satapoomin (2000) provided a preliminary checklist of coral reef fishes of the Gulf of Thailand based on previous reports, particularly by Thai researchers and his own observational records, within 8 major reef sites located in the Gulf of Thailand, including Koh Tao (Turtle Island). More recently, Scaps (2006) during a visit to Koh Tao, listed a total of 175 species in 44 families of fishes living on or near coral reefs down to the limit of coral growth or approximately 30 m of depth. According to Scaps (2006), although Koh Tao is the best studied site in the Gulf of Thailand, the list of fishes is still incomplete due to the fact that this survey was done only during one season and also because of the cryptic nature of many small fishes.

MATERIALS AND METHODS

In order to avoid the seasonality and the cryptic fishes disadvantages, data and photographs taken between 2011 and 2013 were obtained by the second author and confirmed with other local divers living on the island year-round. Discussions with long time island residents, and sharing of the photos on social media sites from the island, were also used to confirm observations and biotopes. Supplemental information on the observed species were also provided by the second author (>2,000 dives around the island over 7 years).

Species were identified and checked through the use of various taxonomic literatures and pictorial guide books, such as Myers (1991), Kuitert (1992, 1998), Randall (1992, 1995), Lieske and Myers (1994); Allen and Steen (1996), Allen (1997), Randall *et al.* (1997), Allen *et al.* (2005) and Traquet and Diringier (2012).

We used FishBase (Froese and Pauly, 2013) and the Catalog of Fishes (Eschmeyer and Fricke 2013) websites for updating fish taxonomy.

RESULTS

Twenty-one coral reef fish species not listed in Satapoomin (2000) and Scaps (2006) have been found to occur in Koh Tao.

Family Dasyatidae: a skate of the genus *Himantura* (Family Dasyatidae) (Figure 2A) was observed over a sandy bottom in a cave under a submerged coral pinnacle in Tanote Bay, at a depth of 9 m. When observed on the island, this species is generally found on sandy bottoms or under coral heads or boulders within a close proximity (<150 m) from coral reefs areas ranging in depth from 8–25 m.

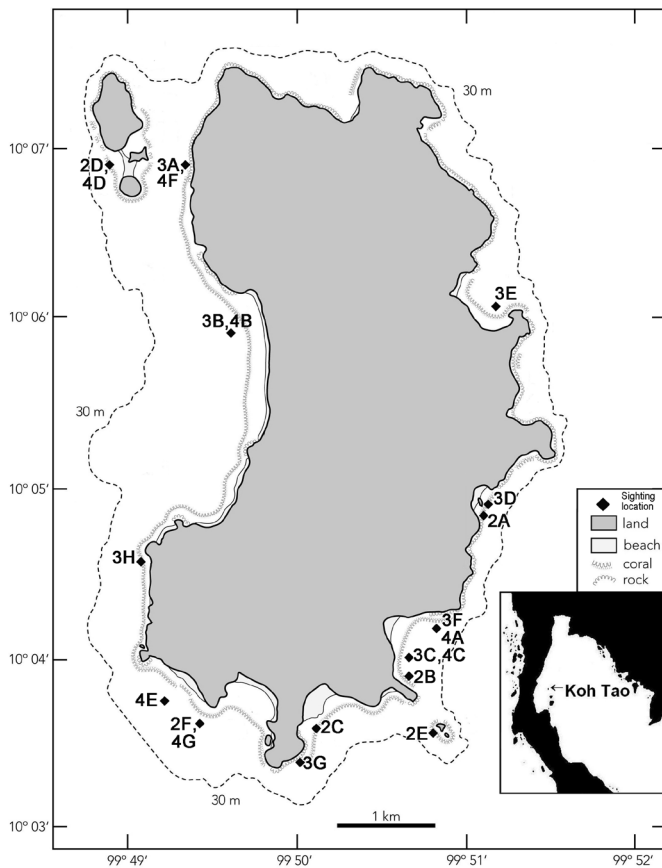


FIGURE 1. Map of the study area showing the locations of the sightings for the photographs shown in Figures 2-4. Codes on the map refer to the figure number and plate letter for each species.

Family Antennariidae: two species of Antennariidae were found in Koh Tao for the first time. *Antennatus nummifer* (Figure 2B) was observed in a small crevice in a large (2 m diameter) coral boulder isolated in a sand flat about 80 m from the reef in Hin Ngam. Two individuals were observed regularly in the same location for about 8 months during 2012 while *Histrion histrio* (Figure 2C) was detected in floating debris or mooring lines at the water surface; only 4 individuals have been found from 2011–2013, with no prior records or reports.

Family Balistidae: the triggerfish *Pseudobalistes marginatus* (Figure 2D) was found over a sandy bottom adjacent to an artificial reef site near Twin Peaks at a depth of 10 m. The species is generally observed over sandy/rubble areas, especially in the vicinity of Koh Nang Yuan, and have also been observed mating/nesting during March–April over several years at Green Rock.

Family Chaetodontidae: the butterflyfish *Parachaetodon ocellatus* (Figure 2E) was observed in sheltered coral/rubble areas or near the reef edge at depths ranging from 3–14 m.

Family Diodontidae: the pufferfish *Cylichthys orbicularis* has been observed in sandy bottom areas, especially around marine debris, sponges, or soft corals of *Dendronephthya* spp. It tends to be cryptic and solitary, and ranges in depth from 10–20 m.

Family Labridae: the wrasse *Choerodon schoenleinii* (Figure 3A) was observed on two separate occasions at the same location, an area 9 m deep with very little coral coverage and a relatively high abundance of macroalgae.

Family Monacanthidae: the filefish *Monacanthus*

chinensis (Figure 3B) was found on coastal algal reef adjacent to the fringing reef of Sairee beach at a depth of 9 m. Multiple individuals have also been observed at the artificial reef site in Mae Haad Bay, generally feeding on algae and small tunicates at a depth of 6–12 m.

Family Ophichthyidae: the serpent eel *Callechelys marmorata* (Figure 3C) was found buried in sand with only the head protruding at a depth of 8 m in the vicinity of Hin Ngam reef. Individuals have been found in other areas of the same bay and also in Mango Bay, generally at a depth between 7–12 m, but occasionally as shallow as 0.5 m.

Family Platycephalidae: the flathead fish *Thysanophrys* cf. *chiltonae* (Figure 3D) was observed lying on a sandy bottom at a depth of 11 m at the artificial reef site in Tanote Bay. No other reports or observations have been found.

Family Plotosidae: juveniles of the catfish *Plotosus lineatus* (Figure 3E) were observed in dense ball-shaped, steam-rolling over the sandy bottom at a depth of 16 m in Hin Wong Bay. Similar balls of juveniles have also been found at Mango Bay and Ao Leuk Bay, also in sandy/muddy areas at a depth of 9–18 m. There are no reports of adult *Plotosus lineatus* at the island.

Family Scaridae: a solitary adult male of humphead parrotfish (*Bolbometopon muricatum*) (Figure 3F) was found over a rubble bottom at a depth of 10 m near the artificial reef site at Hin Fai. Although sightings of this species are rare for the island, solitary individuals and groups of up to three individuals have been reported in the vicinity of Ao Leuk and King Kong Rock, usually very close to reef areas.

Family Scorpaenidae: three species of Scorpaenidae were found in Koh Tao for the first time. The lionfish *Pterois russelii* (Figure 3G) was found on sandy substrate under a rock ledge, and has also been observed in gardens of the soft coral *Dendronephthya* at a depth of 8–30 m. In 2006, two individuals were also observed at the submerged granite pinnacle known as Chumphon Pinnacle, located 16 km Northwest of the island; they disappeared from the area in 2007, and were not observed there again until 2012. The scorpionfishes *Scorpaenopsis* cf. *neglecta* (Figure 3H) and *Scorpaenopsis* cf. *ramaraoi* (Figure 4A) were observed in sheltered reefs among coral rubble and boulders. These species are cryptic and difficult to observe but can be found in most sites around the island at a depth of 2–30 m.

Family Synanceiidae: two species of Synanceiidae were found in Koh Tao for the first time. The stonefish *Synanceia* cf. *verrucosa* (Figure 4B) was observed partially buried in sand in front of Sairee Beach, at a depth of 14 m while the devilfish *Inimicus* cf. *didactylus* (Figure 4C) was observed among coral rubble. These two species are rare at the island, and are cryptic. In 2012, a possible mating pair of *Inimicus* cf. *didactylus* were observed in the sands adjacent to Hin Ngam reef and, subsequently were observed over a period of about 14 days in the same location.

Family Syngnathidae: the pipefish *Doryrhamphus janssi* (Figure 4D) has been found in reef crevices or in small caves in the vicinity of Twin Peaks and Tanote Bay. The seahorse *Hippocampus spinosissimus* (Figure 4E) has been found in sandy bottom areas at a depth of 13–16 m. The species is rare for the island, but has also been observed in the vicinity of Sai Nuan and Twin Peaks. The seahorse

Hippocampus trimaculatus (Figure 4F) has also been found in sandy bottom areas. One individual was observed free floating at 5 m depth, attaching to marine debris. Inspection of the catch from local trawling vessels has also confirmed the presence of *H. trimaculatus* around the island. The pipefish *Trachyrhamphus bicoarctatus* (Figure 4G) has been observed over sandy bottom areas at depths

ranging from 4–28 m in many locations around the island.

DISCUSSION

The present manuscript will further contribute to our knowledge on Koh Tao coral reef fish diversity and can be regarded as an update on the publications by Satapoomin (2000) and Scaps (2006).

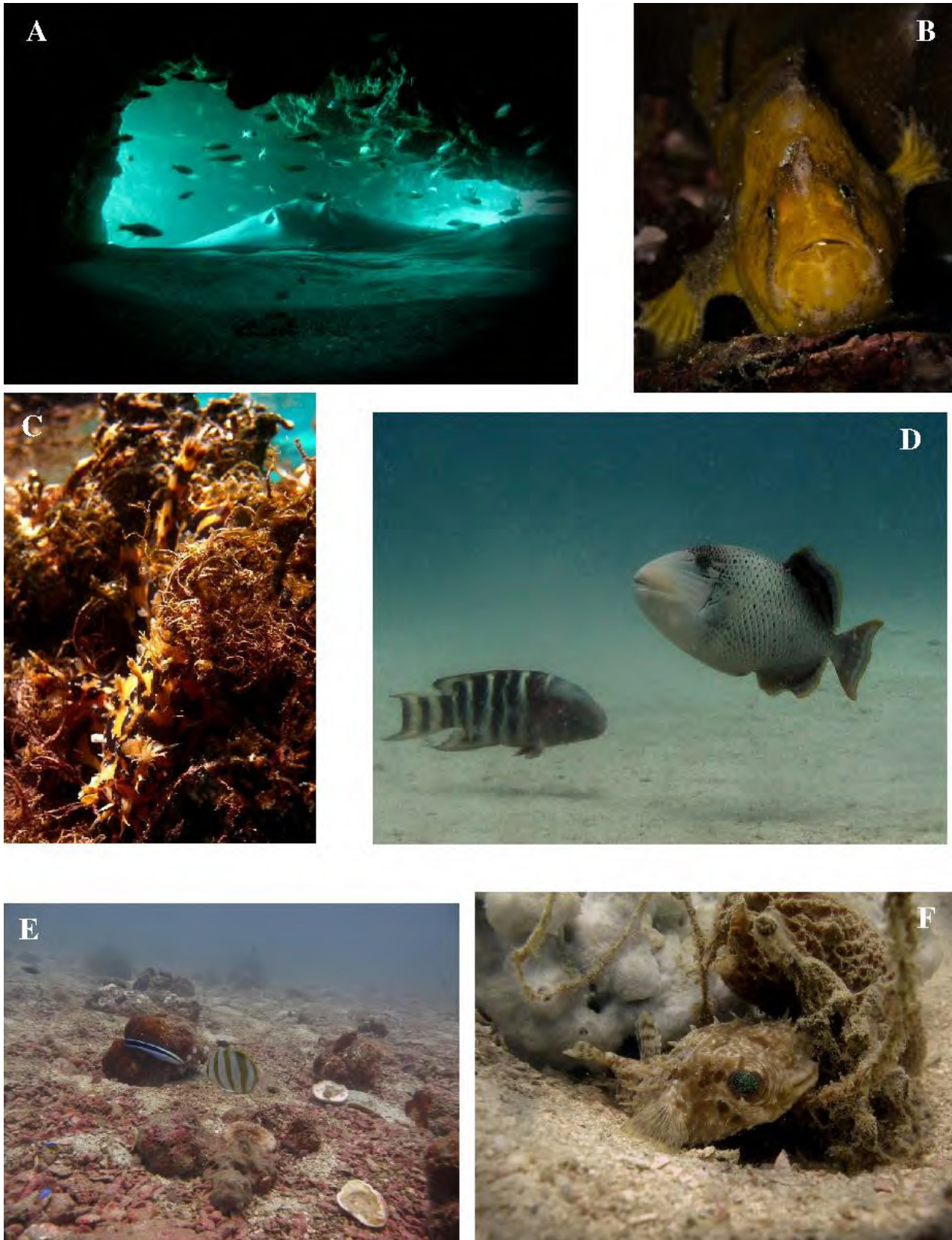


FIGURE 2. New records of fishes from Koh Tao: A, *Himantura* sp. (Dasyatidae); B, *Antennatus nummifer* (Antennariidae); C, *Histrio histrio* in floating weeds (Antennariidae); D, *Pseudobalistes flavimarginatus* (Balistidae); E, *Parachaetodon ocellatus* (Chaetodontidae); F, *Cyclichthys orbicularis* (Didodontidae).

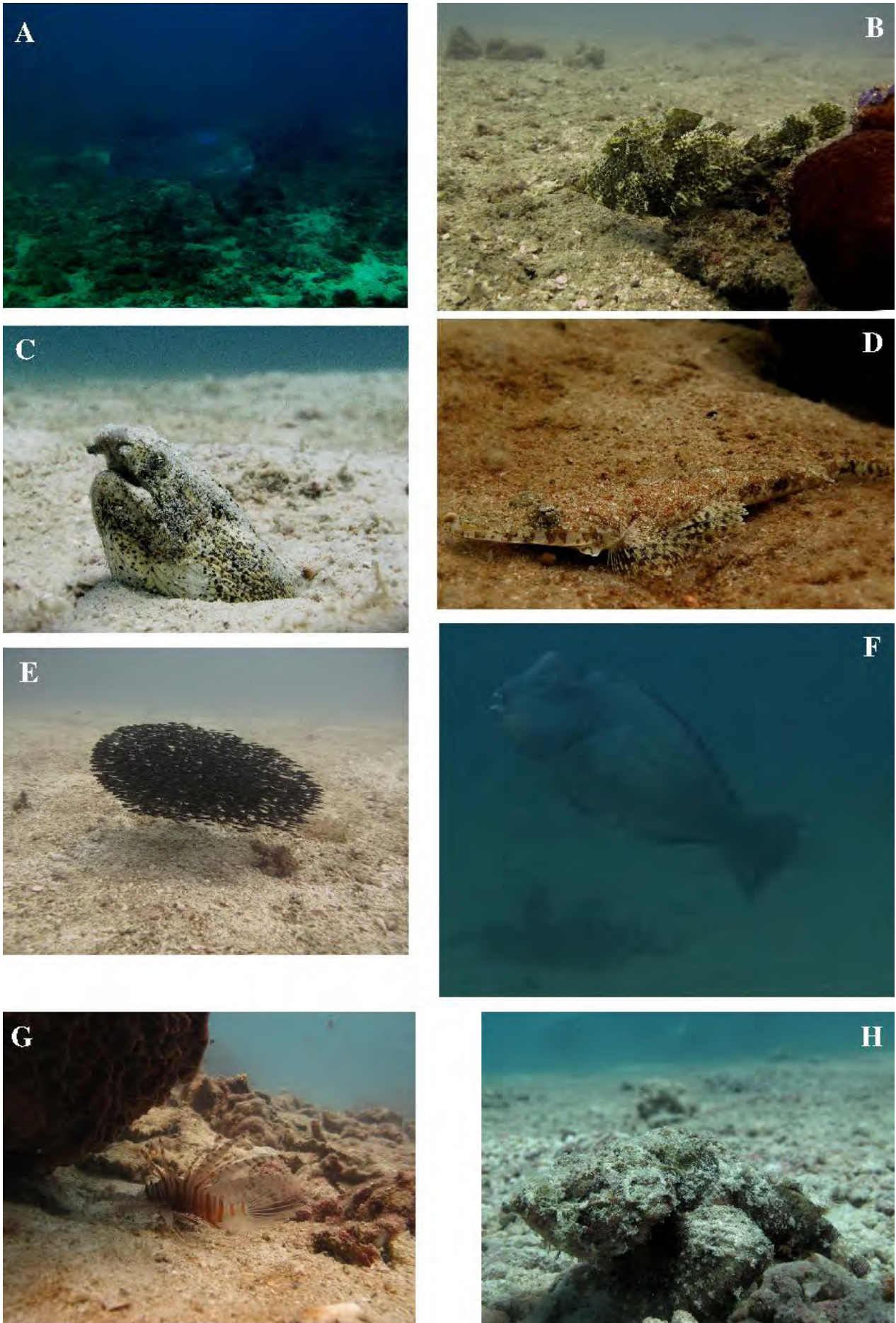


FIGURE 3. New records of fishes from Koh Tao: A, *Choerodon schoenleinii* (Labridae); B, *Monacanthus chinensis* (Monacanthidae); C, *Callechelys marmorata* (Ophichthyidae) buried in sand with only head protruding; D, *Thysanophrys* cf. *chiltonae* (Platycephalidae) lying on sandy bottom; E, juveniles of *Plotosus lineatus* in a dense ball-shaped school (Plotosidae); F, *Bolbometopon muricatum*, solitary adult (Scaridae); G, *Pterois russelii* (Scorpaenidae); H, *Scorpaenopsis* cf. *neglecta* (Scorpaenidae).

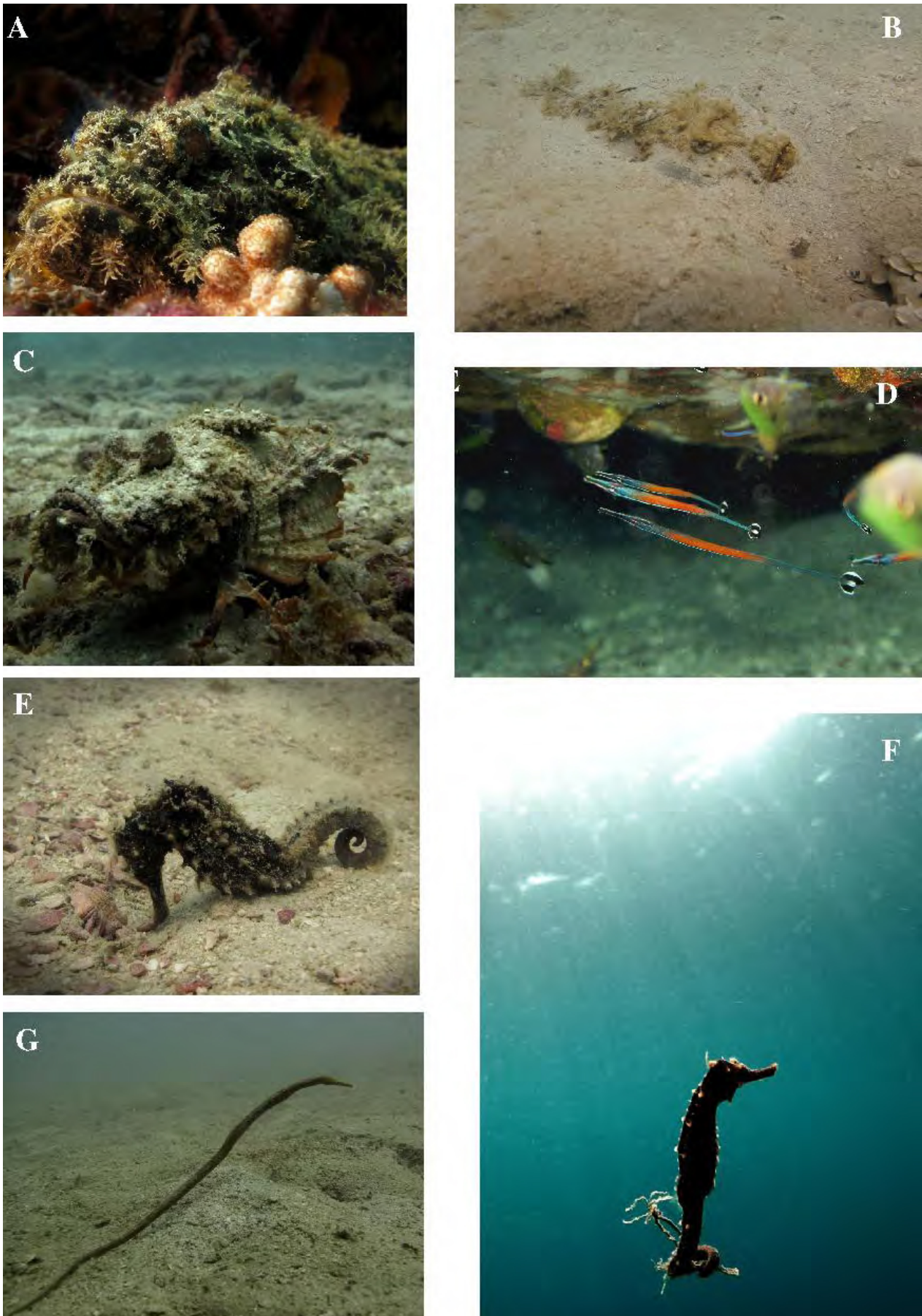


FIGURE 4. New records of fishes from Koh Tao: A, *Scorpaenopsis* cf. *ramarai* (Scorpaenidae); B, *Synanceia* cf. *verrucosa* partially buried in sand; C, *Inimicus* cf. *didactylus* (Synanceiidae); D, *Doryrhamphus* *janssi* (Syngnathidae); E, *Hippocampus* *spinosissimus* (Syngnathidae); F, a large pelagic adult of *Hippocampus* *trimaculatus* (Syngnathidae); G, *Trachyrhamphus* *bicoarctatus* (Syngnathidae).

It is the first time that species belonging to the families Antennariidae (genera *Antennatus* and *Histrion*), Ophichthyidae (genus *Callechelys*), Platycephalidae (genus *Thysanophrys*), Plotosidae (genus *Plotosus*), Scorpaenidae (genera *Scorpaenopsis* and *Pterois*) and Synanceiidae (genera *Inimicus* and *Synanceia*) and reef-fish genera of several families (*Hymantura*, Dasyatidae; *Pseudobalistes*, Balistidae; *Parachaetodon*, Chaetodontidae; *Cyclichthys*, Diodontidae; *Choerodon*, Labridae; *Monacanthus*, Monacanthidae; *Bolbometopon*, Scaridae; and *Doryrhamphus*, *Hippocampus*, and *Trachyrhamphus*, Syngnathidae) have been recorded in Koh Tao (Table 1).

Most of the fishes newly recorded in Koh Tao are small and/or cryptic species often overlooked in visual censuses (*Antennatus nummifer* and *Histrion histrion* (Antennariidae), *Callechelys marmorata* (Ophichthyidae), *Thysanophrys* cf. *chiltonae* (Platycephalidae), *Plotosus lineatus* (Plotosidae), *Scorpaenopsis* cf. *neglecta* and *S.* cf. *ramaraoi* (Scorpaenidae), *Inimicus* cf. *didactylus* (Synanceiidae), *Synanceia* cf. *verrucosa* (Synanceiidae), *Doryrhamphus janssi*, *Hippocampus spinosissimus*, *H. trimaculatus* and *Trachyrhamphus bicoarctatus* (Syngnathidae)). Nevertheless, during this study we also recorded a number of typical reef-fish species in several families, which are visually obvious: *Pseudobalistes flavimarginatus* (Balistidae), *Parachaetodon ocellatus* (Chaetodontidae), *Cyclichthys orbicularis* (Diodontidae), *Choerodon schoenleinii* (Labridae), *Monacanthus chinensis* (Monacanthidae), *Bolbometopon muricatum* (Scaridae), *Pterois russelii* (Scorpaenidae). For example *B. muricatum* is the largest parrotfish species, growing to lengths of 1.3 m (Lieske and Myers 1994) and weighting up to 46 kg (Randall *et al.* 1997). Satapoomin (2000) was surprised that species of the genera *Pterois* (Scorpaenidae), *Bolbometopon* (Scaridae) and *Pseudobalistes* (Balistidae) which are visually obvious and well represented elsewhere were not yet recorded in Koh Tao. As surveys carried out previously at Koh Tao did not reveal the presence of these very conspicuous species, it can be inferred that they are most probably rare in the Gulf of Thailand. In Koh Tao *P. ocellatus* was not observed during the period 2006–2008 but since then it has been observed regularly (about 1 in 10 dives); so, this species is not especially rare in Koh Tao. *C. schoenleinii* has only recently been observed (2013) in Koh Tao and *M. chinensis* has been observed from time to time in Koh Tao sometimes in groups.

Most of the fishes newly recorded in Koh Tao inhabit sheltered reefs among coral rubble and weed (*Parachaetodon ocellatus*, *Choerodon schoenleinii*, *Monacanthus chinensis*, *Bolbometopon muricatum*, *Scorpaenopsis* cf. *neglecta*, *S.* cf. *ramaraoi*, *Inimicus* cf. *didactylus*) and/or sandy bottoms (*Himantura* sp., *Pseudobalistes flavimarginatus*, *Cyclichthys orbicularis*, *Callechelys marmorata*, *Thysanophrys* cf. *chiltonae*, *Plotosus lineatus*, *Synanceia* cf. *verrucosa*, *Trachyrhamphus bicoarctatus*). Others are associated with sponges (*Antennatus nummifer*), the soft corals *Dendronephthya* spp. (*C. orbicularis*, *Pterois russelii*), or with floating weeds and marine debris (*Histrion histrion*). *Hippocampus spinosissimus* and *H. trimaculatus* are rare inhabitants of sheltered reefs, found among clumps of algae or in seagrass beds. *Doryrhamphus janssi* is found

in reef crevices or in small caves. Most of the fishes newly recorded from Koh Tao are widely distributed throughout the central Indo-west Pacific region (75%); others are restricted to west Pacific-eastern Indian Ocean (10%) or west Pacific (10%) or are circumtropical (5%) (Table 1).

Of the 21 species reported for the first time from Koh Tao, 7 species (*Antennatus nummifer* (Antennariidae), *Pseudobalistes marginatus* (Balistidae), *Monacanthus chinensis* (Monacanthidae), *Callechelys marmorata* (Ophichthyidae), *Thysanophrys* cf. *chiltonae* (Platycephalidae), *Bolbometopon muricatum* (Scaridae) and *Synanceia* cf. *verrucosa* (Synanceiidae)) are new records for the Gulf of Thailand. To date, 223 species of coral reef fishes belonging to 53 families are known from Koh Tao including the species found in the present study.

For a discussion about zoogeographical analysis and faunal composition of the reef-fish fauna in Koh Tao and the Gulf of Thailand see Satapoomin (2000).

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TABLE 1. Fish species recorded at Koh Tao with note on its record (1 = Satapoomin, 2000; 2 = Scaps, 2006; 3 = this study). Genera and species are arranged alphabetically within each family. An asterisk denotes a new record for Koh Tao. The categories of zoogeographical distribution of fishes are Circumtropical (CIR), Indo-west Pacific (INWP), West Pacific (WP), Indo-Malayan (IM), Indo-Australian (IA) and eastern Indian Ocean (EIND). The other notation (nd) marks that the distribution range is not determined.

SPECIES	NOTE	DISTRIBUTION
Carcharhinidae (1)		
<i>Carcharhinus melanopterus</i> (Quoy & Gaimard, 1824)	1, 2	INWP
Stegostomatidae (1)		
<i>Stegostoma fasciatum</i> (Hermann, 1783)	1	INWP
Dasyatidae (2)		
<i>Taeniura lymma</i> (Forsskål, 1775)	1, 2	INWP
* <i>Himantura</i> sp.	3	nd
Acanthuridae (1)		
<i>Naso lituratus</i> (Forster, 1801)	1	INWP
Antennariidae (2)		
* <i>Antennatus nummifer</i> (Cuvier, 1817)	3	INWP
* <i>Histrio histrio</i> (Linnaeus, 1758)	3	CIR
Apogonidae (9)		
<i>Archamia fucata</i> (Canton, 1850)	1, 2	INWP
<i>Archamia zosterophora</i> (Bleeker, 1856)	1	WP
<i>Cheilodipterus artus</i> Smith, 1961	1, 2	INWP
<i>Cheilodipterus macrodon</i> (Lacepède, 1802)	1, 2	INWP
<i>Cheilodipterus quinquelineatus</i> Cuvier, 1828	1, 2	INWP
<i>Ostorhinchus cyanosoma</i> Bleeker, 1853	1, 2	INWP
<i>Pristiapogon exostigma</i> (Jordan & Starks, 1906)	1	INWP
<i>Pristiapogon kallopterus</i> Bleeker, 1856	1, 2	INWP
<i>Pristicon trimaculatus</i> Cuvier, 1828	1	WP
Balistidae (2)		
<i>Balistoides viridescens</i> (Bloch & Schneider, 1801)	1, 2	INWP
* <i>Pseudobalistes flavimarginatus</i> (Rüppell, 1829)	3	INWP
Belonidae (1)		
<i>Tylosurus crocodilus</i> (Peron & Lesueur, 1821)	1, 2	CIR
Blenniidae (4)		
<i>Cirripectes filamentosus</i> (Alleyne & Macleay, 1877)	1, 2	INWP
<i>Ecsenius yaeyamaensis</i> (Aoyagi, 1954)	1	WP-EIND
<i>Istiblennius edentulus</i> (Bloch & Schneider, 1801)	1, 2	INWP
<i>Salarias fasciatus</i> (Bloch, 1786)	1, 2	INWP
Caesionidae (3)		
<i>Caesio caerulea</i> Lacepède, 1801	1, 2	INWP
<i>Caesio cunning</i> (Bloch, 1791)	1, 2	WP-EIND
<i>Pterocaesio chrysozona</i> Cuvier, 1830	1, 2	INWP
Callionymidae (1)		
<i>Callionymus</i> sp.	1, 2	nd
Carangidae (9)		
<i>Alepes vari</i> (Cuvier, 1833)	1, 2	INWP
<i>Atule mate</i> (Cuvier, 1833)	1	INWP
<i>Carangoides bajad</i> (Forsskål, 1775)	1, 2	INWP
<i>Carangoides ferdau</i> (Forsskål, 1775)	1, 2	INWP
<i>Caranx ignobilis</i> (Forsskål, 1775)	2	INWP
<i>Caranx sexfasciatus</i> Quoy & Gaimard, 1825	1, 2	INWP
<i>Scomberoides commersonianus</i> Lacepède, 1801	1	INWP
<i>Selaroides leptolepis</i> (Cuvier, 1833)	2	WP-EIND
<i>Trachinotus bailloni</i> (Lacepède, 1801)	1	INWP
Chaetodontidae (6)		
<i>Chaetodon lineolatus</i> Cuvier, 1831	2	INWP
<i>Chaetodon octofasciatus</i> Bloch, 1787	1, 2	WP-EIND
<i>Chaetodon wiebeli</i> Kaup, 1863	1, 2	WP
<i>Chelmon rostratus</i> (Linnaeus, 1758)	1, 2	WP
<i>Heniochus acuminatus</i> (Linnaeus, 1758)	1, 2	WP
* <i>Parachaetodon ocellatus</i> (Cuvier, 1831)	3	WP-EIND
Chanidae (1)		
<i>Chanos chanos</i> (Forsskål, 1775)	1	INWP
Clupeidae (1)		
<i>Spratelloides gracilis</i> (Temminck & Schlegel, 1846)	1, 2	INWP
Diodontidae (3)		
* <i>Cylichthys orbicularis</i> (Bloch, 1785)	3	INWP

TABLE 1. Continued.

SPECIES	NOTE	DISTRIBUTION
<i>Diodon histrix</i> Linnaeus, 1758	1, 2	CIR
<i>Diodon liturosus</i> Shaw, 1804	1, 2	INWP
Echeneidae (1)		
<i>Echeneis naucrates</i> Linnaeus, 1758	2	CIR
Ephippidae (2)		
<i>Platax pinnatus</i> (Linnaeus, 1758)	2	WP-EIND
<i>Platax teira</i> (Forsskål, 1775)	2	INWP
Gerreidae (1)		
<i>Gerres oyena</i> (Forsskål, 1775)	1, 2	INWP
Gobiesocidae (1)		
<i>Diademichthys lineatus</i> (Sauvage, 1883)	1, 2	INWP
Gobiidae (17)		
<i>Amblyeleotris periphthalma</i> (Bleeker, 1853)	1, 2	INWP
<i>Amblyeleotris steinitzi</i> (Klausewitz, 1974)	1, 2	INWP
<i>Amblygobius decussatus</i> (Bleeker, 1855)	1	WP
<i>Amblygobius nocturnus</i> (Herre, 1945)	1	WP
<i>Amblygobius phalaena</i> (Valenciennes, 1837)	1, 2	WP
<i>Cryptocentrus caeruleomaculatus</i> (Herre, 1933)	2	INWP
<i>Cryptocentrus cinctus</i> (Herre, 1936)	1, 2	WP
<i>Cryptocentrus strigiliceps</i> (Jordan & Seale, 1906)	1, 2	INWP
<i>Ctenogobius pomastictus</i> Lubbock & Polunin, 1977	1	WP
<i>Eviota pellucida</i> Larson, 1976	1	WP
<i>Eviota sebreei</i> Jordan & Seale, 1906	1	INWP
<i>Exyrias bellisimus</i> (Smith, 1959)	1, 2	INWP
<i>Fusigobius neophytus</i> (Günther, 1877)	1	INWP
<i>Istigobius decoratus</i> (Herre, 1927)	1	INWP
<i>Istigobius ornatus</i> (Rüppell, 1830)	1	INWP
<i>Valenciennesa muralis</i> (Valenciennes, 1837)	1, 2	WP-EIND
<i>Valenciennesa sexguttata</i> (Valenciennes, 1837)	1	INWP
Haemulidae (3)		
<i>Diagramma pinctum</i> (Thunberg, 1792)	1, 2	INWP
<i>Plectorhinchus chaetodonoides</i> Lacepède, 1801	1, 2	WP-EIND
<i>Plectorhinchus unicolor</i> (Macleay, 1883)	1	WP
Hemiramphidae (1)		
<i>Hemiramphus far</i> (Forsskål, 1775)	1	INWP
Holocentridae (2)		
<i>Myripristis hexagona</i> (Lacepède, 1802)	1, 2	INWP
<i>Sargocentrum rubrum</i> (Forsskål, 1775)	1, 2	INWP
Kyphosidae (2)		
<i>Kyphosus cinerascens</i> (Forsskål, 1775)	1, 2	INWP
<i>Kyphosus vaigiensis</i> (Quoy & Gaimard, 1825)	1, 2	INWP
Labridae (23)		
<i>Anampses caeruleopunctatus</i> Rüppell, 1829	1, 2	INWP
<i>Cheilinus chlororus</i> (Bloch, 1791)	1, 2	INWP
<i>Cheilinus fasciatus</i> (Bloch, 1791)	1, 2	INWP
<i>Cheilinus trilobatus</i> Lacepède, 1801	1, 2	INWP
* <i>Choerodon schoenleinii</i> (Valenciennes, 1839)	3	INWP
<i>Cirrhilabrus cyanopleura</i> (Bleeker, 1851)	1	WP
<i>Diproctacanthus xanthurus</i> (Bleeker, 1856)	1, 2	IA
<i>Epibulus insidiator</i> (Pallas, 1770)	1, 2	INWP
<i>Halichoeres argus</i> (Bloch, 1791)	1, 2	WP-EIND
<i>Halichoeres bicolor</i> (Bloch & Schneider, 1801)	1	IM
<i>Halichoeres chloropterus</i> (Bloch, 1791)	1, 2	IA
<i>Halichoeres leucurus</i> (Walbaum, 1792)	1, 2	IM
<i>Halichoeres margaritaceus</i> (Valenciennes, 1839)	1, 2	WP
<i>Halichoeres marginatus</i> Rüppell, 1835	1, 2	INWP
<i>Halichoeres melanochir</i> Fowler & Bean, 1928	1	WP
<i>Halichoeres melanurus</i> (Bleeker, 1851)	1, 2	WP
<i>Halichoeres nigrescens</i> (Bloch & Schneider, 1801)	1, 2	INWP
<i>Hemigymnus melapterus</i> (Bloch, 1791)	1, 2	INWP
<i>Labroides dimidiatus</i> (Valenciennes, 1839)	1, 2	INWP
<i>Oxycheilinus digrammus</i> (Lacepède, 1801)	1, 2	INWP
<i>Stethojulis interrupta</i> (Bleeker, 1851)	1	INWP
<i>Stethojulis trilineata</i> (Bloch & Schneider, 1801)	1, 2	WP-EIND

TABLE 1. Continued.

SPECIES	NOTE	DISTRIBUTION
<i>Thalassoma lunare</i> (Linnaeus, 1758)	1, 2	INWP
Lethrinidae (6)		
<i>Lethrinus atkinsoni</i> Seale, 1909	1, 2	WP
<i>Lethrinus erythropterus</i> Valenciennes, 1830	1, 2	INWP
<i>Lethrinus harak</i> (Forsskål, 1775)	2	INWP
<i>Lethrinus lentjan</i> (Lacepède, 1802)	1, 2	INWP
<i>Lethrinus microdon</i> Valenciennes, 1830	1, 2	INWP
<i>Lethrinus nebulosus</i> (Forsskål, 1775)	1, 2	INWP
Lutjanidae (6)		
<i>Lutjanus argentimaculatus</i> (Forsskål, 1775)	1, 2	INWP
<i>Lutjanus decussatus</i> (Cuvier, 1828)	1	WP-EIND
<i>Lutjanus fulviflamma</i> (Forsskål, 1775)	1, 2	INWP
<i>Lutjanus monostigma</i> (Cuvier, 1828)	2	INWP
<i>Lutjanus russellii</i> (Bleeker, 1849)	1, 2	INWP
<i>Lutjanus vitta</i> (Quoy & Gaimard, 1824)	1, 2	INWP
Microdesmidae (1)		
<i>Ptereleotris microlepis</i> (Bleeker, 1856)	1, 2	INWP
Monacanthidae (3)		
<i>Aluterus scriptus</i> (Osbeck, 1765)	1, 2	CIR
<i>Anacanthus barbatus</i> Gray, 1830	1	WP-EIND
* <i>Monacanthus chinensis</i> (Osbeck, 1765)	3	WP
Mugilidae (4)		
<i>Crenimugil crenilabis</i> (Forsskål, 1775)	1, 2	INWP
<i>Ellochelone vaigiensis</i> (Quoy & Gaimard, 1825)	1, 2	INWP
<i>Moolgarda seheli</i> (Forsskål, 1775)	1, 2	INWP
<i>Oedalechilus labiosus</i> (Valenciennes, 1836)	2	INWP
Mullidae (2)		
<i>Parupeneus indicus</i> (Shaw, 1803)	1, 2	INWP
<i>Upeneus tragula</i> Richardson, 1846	1, 2	INWP
Muraenidae (1)		
<i>Siderea thyrsoideus</i> (Richardson, 1845)	2	INWP
Nemipteridae (8)		
<i>Pentapodus vitta</i> Quoy & Gaimard, 1824	2	WP-EIND
<i>Scolopsis affinis</i> Peters, 1877	1, 2	WP-EIND
<i>Scolopsis bilineatus</i> (Bloch, 1793)	1, 2	WP-EIND
<i>Scolopsis ciliatus</i> (Lacepède, 1802)	1, 2	WP
<i>Scolopsis lineatus</i> Quoy & Gaimard, 1824	1, 2	WP
<i>Scolopsis margaritifera</i> (Cuvier, 1830)	1, 2	WP
<i>Scolopsis monogramma</i> (Cuvier, 1830)	1, 2	WP
<i>Scolopsis vosmeri</i> (Bloch, 1792)	1, 2	INWP
Ophichthyidae (1)		
* <i>Callechelys marmorata</i> (Bleeker, 1854)	3	INWP
Ostracidae (1)		
<i>Ostracion cubicus</i> Linnaeus, 1758	2	INWP
Pempheridae (1)		
<i>Pempheris ovalensis</i> Cuvier, 1831	1, 2	INWP
Pinguipedidae (1)		
<i>Parapercis</i> sp.	1, 2	nd
Platycephalidae (1)		
* <i>Thysanophrys</i> cf. <i>chiltonae</i> Schultz, 1966	3	INWP
Plotosidae (1)		
* <i>Plotosus lineatus</i> (Thunberg, 1787)	3	INWP
Pomacanthidae (3)		
<i>Pomacanthus annularis</i> (Bloch, 1787)	1, 2	IA-EIND
<i>Pomacanthus sexstriatus</i> (Cuvier, 1831)	1, 2	WP
<i>Pygoplites diacanthus</i> (Boddaert, 1772)	2	INWP
Pomacentridae (34)		
<i>Abudefduf bengalensis</i> (Bloch, 1787)	1, 2	WP-EIND
<i>Abudefduf notatus</i> (Day, 1869)	1, 2	INWP
<i>Abudefduf sexfasciatus</i> (Lacepède, 1802)	1, 2	INWP

TABLE 1. Continued.

SPECIES	NOTE	DISTRIBUTION
<i>Abudefduf sordidus</i> (Forsskål, 1775)	1, 2	INWP
<i>Abudefduf vaigiensis</i> (Quoy & Gaimard, 1825)	1, 2	INWP
<i>Amblyglyphidodon curacao</i> (Bloch, 1787)	1, 2	WP
<i>Amblyglyphidodon leucogaster</i> (Bleeker, 1847)	1, 2	INWP
<i>Amphiprion perideraion</i> Bleeker, 1855	1, 2	WP
<i>Amphiprion polymnus</i> (Linnaeus, 1758)	2	IM
<i>Cheiloprion labiatus</i> (Day, 1877)	1, 2	IA
<i>Chromis atripectoralis</i> Welander & Schultz, 1951	1, 2	INWP
<i>Chromis cinerascens</i> (Cuvier, 1830)	1, 2	WP-EIND
<i>Chrysiptera biocellatus</i> (Quoy & Gaimard, 1825)	1	INWP
<i>Chrysiptera brownriggii</i> (Bennett, 1828)	1, 2	INWP
<i>Chrysiptera unimaculata</i> (Cuvier, 1830)	1, 2	INWP
<i>Dascyllus reticulatus</i> (Richardson, 1846)	1, 2	WP
<i>Dascyllus trimaculatus</i> (Rüppel, 1829)	1, 2	INWP
<i>Dischistodus melanotus</i> (Bleeker, 1858)	1, 2	WP
<i>Hemiphyphidodon plagiometopon</i> (Bleeker, 1852)	1, 2	IA
<i>Neoglyphidodon melas</i> (Cuvier, 1830)	1, 2	INWP
<i>Neoglyphidodon nigroris</i> (Cuvier, 1830)	1, 2	WP
<i>Neopomacentrus anabatoides</i> (Bleeker, 1847)	1, 2	IM
<i>Neopomacentrus cyanomos</i> (Bleeker, 1856)	1, 2	INWP
<i>Neopomacentrus filamentosus</i> (Macleay, 1882)	1, 2	IA
<i>Plectroglyphidodon lacrymatus</i> (Quoy & Gaimard, 1825)	1, 2	INWP
<i>Pomacentrus alexandrae</i> Evermann & Seale, 1907	1, 2	WP
<i>Pomacentrus chrysurus</i> Cuvier, 1830	1, 2	WP-EIND
<i>Pomacentrus coelestis</i> Jordan & Starks, 1901	1, 2	WP-EIND
<i>Pomacentrus grammorhynchus</i> Fowler, 1918	1, 2	IA
<i>Pomacentrus moluccensis</i> Bleeker, 1853	1, 2	WP
<i>Stegastes fasciolatus</i> (Ogilby, 1889)	1, 2	INWP
<i>Stegastes lividus</i> (Forster, 1801)	1, 2	INWP
<i>Stegastes nigricans</i> (Lacepède, 1802)	1, 2	INWP
<i>Stegastes obreptus</i> (Whitley, 1948)	1, 2	WP-EIND
Pseudochromidae (1)		
<i>Pseudochromis</i> sp.	1, 2	nd
Scaridae (9)		
* <i>Bolbometopon muricatum</i> (Valenciennes, 1840)	3	INWP
<i>Scarus dimidiatus</i> Bleeker, 1859	1, 2	WP
<i>Scarus ghobban</i> Forsskål, 1775	1, 2	INWP
<i>Scarus hypselopterus</i> Bleeker, 1853	1	WP
<i>Scarus niger</i> Forsskål, 1775	1, 2	INWP
<i>Scarus prasiognathos</i> Valenciennes, 1839	1, 2	WP-EIND
<i>Scarus quoyi</i> Valenciennes, 1840	1, 2	WP-EIND
<i>Scarus rivulatus</i> Valenciennes, 1840	1, 2	WP
<i>Scarus rubroviolaceus</i> Bleeker, 1847	1, 2	INWP
Scorpaenidae (3)		
* <i>Pterois russelii</i> Bennett, 1831	3	INWP
* <i>Scorpaenopsis</i> cf. <i>neglecta</i> Heckel, 1837	3	INWP
* <i>Scorpaenopsis</i> cf. <i>ramaraoi</i> Randall & Eschmeyer, 2001	3	INWP
Serranidae (15)		
<i>Cephalopholis boenak</i> (Bloch, 1790)	1, 2	INWP
<i>Cephalopholis cyanostigma</i> (Valenciennes, 1828)	1, 2	WP
<i>Cephalopholis formosa</i> (Shaw, 1812)	1, 2	INWP
<i>Cephalopholis micropion</i> (Bleeker, 1852)	1, 2	WP
<i>Diploprion bifasciatus</i> Cuvier, 1828	1, 2	WP-EIND
<i>Epinephelus caeruleopunctatus</i> (Bloch, 1790)	1, 2	INWP
<i>Epinephelus corallicola</i> (Valenciennes, 1828)	2	WP
<i>Epinephelus erythrurus</i> (Valenciennes, 1828)	2	IM-EIND
<i>Epinephelus fasciatus</i> (Forsskål, 1775)	1, 2	INWP
<i>Epinephelus fuscoguttatus</i> (Forsskål, 1775)	1, 2	INWP
<i>Epinephelus merra</i> Bloch, 1793	1, 2	INWP
<i>Epinephelus ongus</i> (Bloch, 1790)	1, 2	INWP
<i>Epinephelus quoyanus</i> (Valenciennes, 1830)	1, 2	WP
<i>Plectropomus leopardus</i> (Lacepède, 1802)	1, 2	WP
<i>Plectropomus maculatus</i> (Bloch, 1790)	1, 2	IA
Siganidae (7)		
<i>Siganus canaliculatus</i> (Park, 1797)	1, 2	WP-EIND

TABLE 1. Continued.

SPECIES	NOTE	DISTRIBUTION
<i>Siganus corallinus</i> (Valenciennes, 1835)	1, 2	WP-EIND
<i>Siganus guttatus</i> (Bloch, 1787)	1, 2	WP
<i>Siganus javus</i> (Linnaeus, 1766)	1, 2	WP-EIND
<i>Siganus punctatus</i> (Schneider & Forster, 1801)	1, 2	WP
<i>Siganus vermiculatus</i> (Valenciennes, 1835)	1, 2	WP-EIND
<i>Siganus virgatus</i> (Valenciennes, 1835)	1, 2	WP-EIND
Sphyraenidae (3)		
<i>Sphyraena jello</i> Cuvier, 1829	2	INWP
<i>Sphyraena obtusata</i> Cuvier, 1829	1, 2	INWP
<i>Sphyraena qenie</i> Klunzinger, 1870	1, 2	INWP
Synanceiidae (2)		
* <i>Inimicus</i> cf. <i>didactylus</i> (Pallas, 1769)	3	WP-EIND
* <i>Synanceia</i> cf. <i>verrucosa</i> Bloch & Schneider	3	INWP
Syngnathidae (5)		
<i>Doryrhamphus dactyliophorus</i> (Bleeker, 1853)	1, 2	WP
* <i>Doryrhamphus janssi</i> (Herald & Randall, 1972)	3	WP
* <i>Hippocampus spinosissimus</i> Weber, 1913	3	INWP
* <i>Hippocampus trimaculatus</i> Leach, 1814	3	INWP
* <i>Trachyrhamphus bicoarctatus</i> (Bleeker, 1857)	3	INWP
Teraponidae (1)		
<i>Terapon jarbua</i> (Forsskål, 1775)	1, 2	INWP
Tetraodontidae (2)		
<i>Arothron nigropunctatus</i> (Bloch & Schneider, 1801)	2	INWP
<i>Arothron stellatus</i> (Bloch & Schneider, 1801)	1, 2	INWP
Tripterygiidae (1)		
<i>Tripterygion</i> sp.	2	nd