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Review of the Marine Gobiid Genus, *Amblyeleotris* (Pisces: Gobiidae) with Seven New Records from Taiwan

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Jeng-Ping Chen, I-Shiung Chen and Kwang-Tsao Shao (1998) Review of the marine gobiid genus, *Amblyeleotris* (Pisces: Gobiidae) with seven new records from Taiwan. *Zoological Studies* **37**(2):111-118. The present paper is a taxonomic review of the marine gobiid genus, *Amblyeleotris,* from Taiwan. This genus includes *A. fontanesii* (Bleeker, 1852), *A. guttata* (Fowler, 1938), *A. japonica* Takagi, 1957, *A. ogasawarensis* Yanagisawa, 1978, *A. periophthalma* (Bleeker, 1853), *A. steinitzi* (Klausewitz, 1974), *A. wheeleri* (Polunin and Lubbock, 1977), and *A. yanoi* Aonuma and Yoshino, 1996. Except for *A. guttata*, the rest are all new additions to the fish fauna of Taiwan. Diagnostic characters, distribution, remarks, and color photos of each species are given.

Key words: Fish taxonomy, Gobies, *Amblyeleotris*, New records, Taiwan.

The fishes of the genus *Amblyeleotris* Bleeker are well known for their symbiotic behavior with snapping shrimp in coral reefs. The characters of this genus are as follows: a slender body; with transverse pattern of cheek papillae; VI-I, 12-16 dorsal rays; I, 12-17 anal rays; 18-22 pectoral rays; longitudinal scale series 50-129; transverse scale rows 17-34; vertebrate 26. This genus is easily confused with *Cryptocentrus* and *Vanderhorstia*. The differences between *Amblyeleotris* and *Cryptocentrus* are that *Amblyeleotris* has more fin rays (12-17 soft dorsal rays and 12-17 soft anal rays), *Cryptocentrus* has ray counts (9-12 soft dorsal rays and 9-11 soft anal rays); the latter has a plate or cup-shaped disc of pelvic but it is separated or connected in the former. The genus *Amblyeleotris* can also be distinguished from *Vanderhorstia* by the pattern of papillae (transverse vs. longitudinal), and snout profile (at angles less than 40° with body axis vs. 50°) (Hoese 1986).

Aonuma and Yoshino (1996) listed valid species belonging to the genus *Amblyeleotris* in the Indo-Pacific area. But since Randall et al. (1994) treated *A. exilis* (Smith, 1958) as a junior synonym of *A. periophthalma* (Bleeker, 1853), there should be 23 valid species in this genus. In Taiwan, the 1st record of this group of fish were reported by Shao et al. (1987), who added *A. fasciatus* (Herre, 1927) and *A. guttata* (Fowler, 1938) to the Taiwan fish fauna. But *A. fasciatus* mentioned above should be considered a misidentification of *A. wheeleri* (Polunin and Lubbock, 1977). Thus, the species *A. fasciatus* appearing in the Fishes of Taiwan (Shen et al. 1993) which cited Shao et al. (1987) should be corrected as *A. wheeleri*.

During the past 5 yr (1989-1994), an intensive survey on inshore fish fauna in the waters around Taiwan was supported by a grant from the National Science Council R.O.C. to the 3rd author. The 3rd author and his colleagues have collected and published descriptions of a number of new species as well as new records (Chen and Shao 1993a,b, Ho et al. 1993, Chen et al. 1994, Gill et al. 1994, Wang et al. 1994, Chen and Shao 1995, Wang et al. 1995). Here we report an additional 5 newly recorded species of the genus *Amblyeleotris: A. fontanesii* (Bleeker), *A. japonica* Takagi, *A. ogasawarensis* Yanagisawa, *A. periophthalma* (Bleeker), and *A. yanoi* Aonuma and Yoshino. An additional record of *A. steinitzi* (Klausewitz) was

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based merely on photographs taken by the authors in the Kenting area and Green Is. Thus, the total number of *Amblyeleotris* known from Taiwan should be increased to 8 species.

MATERIALS AND METHODS

Specimens were collected from northeastern and southern coasts (Kenting National Park) of Taiwan, the Pescadores, and Orchid Is. by scuba diving during our survey of marine fish fauna in Taiwan. All counts of meristic characters followed Akihito in Masuda et al. (1984) and measurements of morphometric characters followed Hubbs and Lagler (1958). Abbreviations used for characters include: D: dorsal fin; A: anal fin; P_1: pectoral fin; P_2: pelvic fin; LR: longitudinal scale rows; TR: transverse scale rows; Pred S: predorsal scales; SL: standard length; HL: head length; BD: body length; Pred L: predorsal length; SD_2L: length of snout to 2nd dorsal origin; SAL: length of snout to anal origin; CPD: caudal peduncle depth; ED: eye diameter; SnL: snout length; HW: head width; and Int: interorbital width. Descriptions of body coloration were based on fresh specimens. All specimens are deposited in the Institute of Zoology, Academia Sinica (ASIZP).

Key to species of the genus *Amblyeleotris* in Taiwan

1a. Body without vertical bands, scattered orange spots; abdomen with black bar ..... *A. guttata*
1b. Body with 5 vertical bands, without orange spots; abdomen without black bar 2
2a. Anal rays 14 or more 3
2b. Anal rays 12 or 13 5
3a. Longitudinal scales less than 80; transverse scales 24 .. .. *A. japonica*
3b. Longitudinal scales more than 80; transverse scales 25-32 4
4a. Predorsal with 9-28 scales ..... *A. fontanesii*
4b. Predorsal without scales ..... *A. yanoi*
5a. Longitudinal scales 81; D VI-I,13; A. I,13 .... *A. ogasawarensis*
5b. Longitudinal scales less than 80; D VI-I,12; A. I,12 6
6a. Predorsal with 18-21 scales ..... *A. wheeleri*
6b. Predorsal without scales 7
7a. Longitudinal scales 74-80; brown blotches in pale areas between vertical bars ..... *A. periophthalma*
7b. Longitudinal scales 62-66; faint yellowish line in pale areas between vertical bars ..... *A. steinitzi*

Amblyeleotris fontanesii (Bleeker, 1852)

(Fig. 1)

Gobius fontanesii Bleeker, 1852: 764 (Bulucumba, Celebes).
Biat lunzonica Seale, 1909: 532.
Gobius fontanesii: Günther, 1861: 74.
Gobius (*Crytocenturs*) *fontanesii*: Weber, 1913: 474.
Cryptocentrus fontanesii: Herre, 1927: 242; Koumans in Weber and De Beaufort, 1953: 89.
Amblyeleotris fontanesii: Myers, 1989: 226.

Material: One specimen, ASIZP 058108, 134.8 mm SL, 12 Apr. 1990. The 3rd nuclear power plant (N3) at Nanwan, Pingtung, 8 m depth.

Diagnosis: D VI-I,15, A I,16, P_1 20, P_2 I,5, LR 105, TR 28, Pred S 20. HL 4.1, BD 5.8, HW 8.1, Pred L 3.47, SD_2L 2.0, SAL 1.7, CPD 8.8 all in SL, ED 3.9, Int 9.7, SnL 5.7 all in HL.

Maxillary reaching middle line of orbit. Body compressed, very slender. Eye high with convex profile of head. Head, nape, breast, and belly with cycloid scales, those on lateral side of trunk ctenoid. Middle spines of 1st dorsal longest. Pelvic fin united by frenum and complete with connecting membrane. Body creamy yellow. Lateral side of body with 3 dark brown bands, 1st one below 1st dorsal fin, 2nd below middle of 2nd dorsal fin, the last below posterior ray of soft dorsal fin. Head with some pearl-like spots. First dorsal fin with a dark blotch. Second dorsal fin with some yellow spots. Pelvic darkish.

Distribution: West Pacific: Philippines, Micronesia, Indonesia, Singapore, and Taiwan. In Taiwan, this species had been only found at Nanwan, Kenting National Park, south Taiwan (Table 1).

*Remark*s: Although Tomiyama (1936) recorded this species from Japan, it should be considered a misidentification of *Amblyeleotris japonica*, Takagi (Aizawa and Senou, 1991). Recently, Iwata et al. (1996) recorded this species in Japanese waters.

Amblyeleotris guttata (Fowler, 1938)

(Figs. 2, 3)

Pteroculiops guttata Fowler, 1938: 133 (Marinduque Is.).
Amblyeleotris guttata: Yanagisawa, 1978: 306; Akihito, in Masuda et al., 1984: 255; Lee in Shen et al. 1993: 533.

Materials: Two specimens, ASIZP 056123, 40.6-64.2 mm in SL., 2 Feb. 1985, Tantzuwan, 6 m; 1 specimen, ASIZP 056124, 44.5 mm in SL., 8 Jan. 1986, Tantzuwan, 6 m; 1 specimen, ASIZP 056125, 55.6 mm in SL., 27 May 1986, Chingwashi, 12 m.

Diagnosis: D VI-I,12; A I,12, P_1. 19; LR 70-75; TR 22-24; Pred S 13-15, HL 3.4-3.7, BD 5.1-5.7, Pred L 2.8-3.1, SD_2L 1.8-1.9, SAL 1.7-1.9 all in SL. SnL 5.4-5.6, ED 3.9-4.4, Int 13.7-15.6 all in HL.

Mouth oblique, maxillary reaching below middle of eye. Thirteen to 15 small scales on median part of nape. Height of the 3rd spine of 1st

dorsal fin longest and lower than body. 2nd dorsal fin as high as 1st one. Caudal fin pointed. Body pale yellow, head and body with scattered orange spots. Two blackish-brown zones on anterior part of body, one between thorax and isthmus, another behind pelvic and forming a triangle, its upper part extending to middle of body. Except transparent pectoral and blackish pelvic fins, all other fins with scattered orange spots.

Distribution: In West Pacific, from East Indies to Samoa, North to Ryukyu Is. This species had been found in coral reef areas around Taiwan (Table 1).

***Amblyeleotris japonica* Takagi, 1957**
(Figs. 4, 5)

Amblyeleotris japonica Takagi, 1957: 105 (Kagoshima, Japan).
Amblyeleotris japonica: Yanagisawa, 1978: 299; Akihito, in Masuda et al., 1984: 255.

Material: One specimen, ASIZP 058106, 55.8 mm SL, 2 Sept. 1991, Yehliu, Taipei Co.; 10 m depth.

Diagnosis: D VI-I,14; A I,14, P_1 20; P_2 I, 5; LR 76; TR 25; Pred S 0. HL 3.9, BD 5.8, HW 7.6, Pred L 3.1, SD_2L 1.8, SAL 1.8, CPD 9.4 all in SL. ED 3.9, Int 12.7, SnL 7.2 all in HL.

Mouth oblique, maxillary extending beyond vertical of midline of eye. Snout obtuse. Head roundish; body elongate and compressed. Scales on body small cycloid anteriorly, becoming larger and ctenoid posteriorly. Head and nape naked. Pelvic frenum present, connecting membrane only on basal part of 5th ray in adult. 3rd spine longest in 1st dorsal. Anal as high as 2nd dorsal. Body color pale yellow, with 5 dark brown bands, the 1st from nape to opercle, the last on caudal peduncle. First dorsal dusky in lower part. Midline of 2nd dorsal with a yellow stripe. Anal fin pale yellow, a brown stripe along middle, lower part pale grey. Caudal fin with a C-shaped, dark brown blotch.

Distribution: Until now this species has only been found in Japan and Taiwan. It was found in northern Taiwan and Penghu (the Pescadores) (Table 1).

***Amblyeleotris ogasawarensis* Yanagisawa, 1978**
(Figs. 6, 7)

Amblyeleotris ogasawarensis Yanagisawa, 1978: 303 (Ogasawara Is., Japan).
Amblyeleotris ogasawarensis: Akihito in Masuda et al., 1984: 255.

Material: One specimen, ASIZP 058107, 59.3 mm SL, 7 Jul. 1993, Kaiyuankang, Orchid Is., Taitung Co., 20 m depth.

Diagnosis: D VI-I,13; A I,13; P_1 19; P_2 I,5; LR 84; TR 28; Pred S 5. HL 3.9, BD 5.8, HW 7.3, Pred L 3.0, SD_2L 1.9, SAL 1.8, CPD 9.6 all in SL. ED 4.0, Int 8.9, SnL 5.6 all in HL.

Mouth oblique, maxillary reaching point of midline of eye. Snout obtuse. Head round, body elongate and compressed. Scales on body small and cycloid, becoming larger and ctenoid posteriorly. Head naked, predorsal with few scales. No frenum, connecting membrane not fully complete on 5th ray in pelvic. In 1st dorsal, 3rd and 4th spines longest. 2nd dorsal and anal as high as 1st dorsal. Body color pale yellow, with 5 transverse red-brown bands; the 1st from nape to opercle, the last on caudal peduncle. A vertical line from eye to end of jaw. Head with scattered small blue spots. First dorsal with small specks and a dark blotch on mid-basal part. Second dorsal with some rows of brown stripes on lower part. Anal with a brown line in middle, distal edge pale brown. Pelvic dusky. Caudal fin with a C-shaped brown blotch.

Table 1. Distribution of the genus *Amblyeleotris* in coastal waters of Taiwan

Species names	Distribution							
	North	West	Penghu	Hsiaoliuchiu	South	East	Lanyu	Green Is.
A. fontanesii (Bleeker, 1852)					V			
A. guttata (Fowler, 1938)	V		V	V	V	V	V	V
A. japonica (Takagi, 1957)	V		V					
A. ogasawarensis Yanagisawa, 1978					V		V	V
A. periophthalma (Bleeker, 1853)	V				V	V		
A. steinitzi (Klausewitz, 1974)				V	V			V
A. wheeleri (Polunin and Lubbock, 1977)	V		V	V	V	V	V	V
A. yanoi Aonuma and Yoshino, 1996					V			

Fig. 1. *Amblyeleotris fontaesii*, ASIZP 058108, 134.8 mm in SL.

Fig. 2. *A. guttata*, ASIZP 056124, 44.5 mm in SL.

Fig. 3. Underwarter photography of *A. guttata*, Nov. 7. 1990, Hsiaoliuchiu by LT Ho.

Fig. 4. *A. japonica*, ASIZP 058106, 55.8 mm in SL.

Fig. 5. Underwater photography of *A. japonica*, Apr. 25, 1991 Penghu, by JP Chen.

Fig. 6. *A. ogasawarensis*, ASIZP 058017, 59.3 mm in SL.

Fig. 7. Underwater photography of *A. ogasawarensis*, Jul. 7, 1993, Orchid Is., by JP Chen.

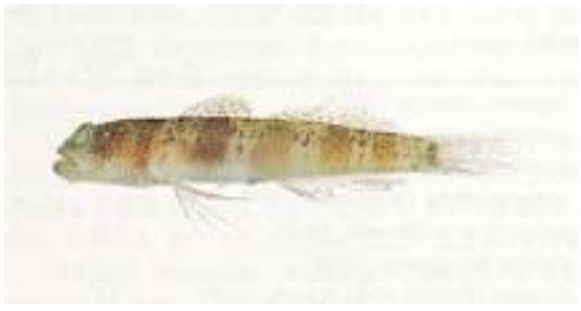

Fig. 8. *A. periophthalma*, ASIZP 058100, 35.9 mm in SL.

Distribution: From Japan to Taiwan. In Taiwan, this species had been found at 3 places: southern Taiwan, Green Is., and Orchid Is.

Amblyeleotris periophthalma **(Bleeker, 1853)**
(Figs. 8, 9)

Eleotris periophthalmus Bleeker, 1853: 477 (Jakarta, Indonesia).
Cryptocentrus exillis Smith 1958: 153 (Zanzibar).
Amblyeleotris maculata Yanagisawa 1976 (Okinawa, Japan).
Amblyeleotris periophthalmus: Bleeker 1874: 373; Polunin and Lubbock, 1980: 51.

Material: One specimen, ASIZP 058100, 35.9 mm SL, 9 July 1993, Tungao, Ilan Co., 12 m.

Diagnosis: D VI-I,12; A I,12; P_1 18; LR 76; TR 26; Pred S 0. HL 3.2, BD 5.5, HW 7.8, Pred L 2.3, SD_2L 1.7, SAL 1.7, CPD 9.3 all in SL. ED 5.0, SnL 21.4, Int 5.6 all in HL.

Mouth oblique, maxillary extends to midline of eye. Snout obtuse. Body elongate and compressed. Head and nape naked. Scales in anterior part of body cycloid, becoming ctenoid at posterior part after 3rd or 4th dorsal spine. Pelvic fins connected at base of 5th ray and without frenum. Five vertical broad brown bands on body; pale interspaces with small irregular brown blotches. Cheek and postorbital head with small yellow ocelli. Caudal fin base with a large transverse dark spot.

Distribution: Indo-Pacific.

Fig. 9. Underwater photography of *A. periophthalma*, Sept. 3, 1991, Kueihou, north Taiwan, by JP Chen.

Amblyeleotris steinitzi **(Klausewitz, 1974)**
(Fig. 10)

Cryptocentrus steinitzi Klausewitz, 1974: 70 (Gulf of Aqaba).

Diagnosis: Mouth oblique, maxillary extends to midline of eye. Body whitish, with 5 brown bands. Interspaces between bands wider than dark bands, and with some faint yellow lines. A row of blue spots scatterd from postorbital area to 1st dark band.

Fig. 10. Underwater photography of *A. steinitzi*, Jan. 21, 1991, Nanwan, by JP Chen.

Fig. 12. Underwater photography of *A. wheeleri*, Dec. 3, 1991, Nanwan, by JP Chen.

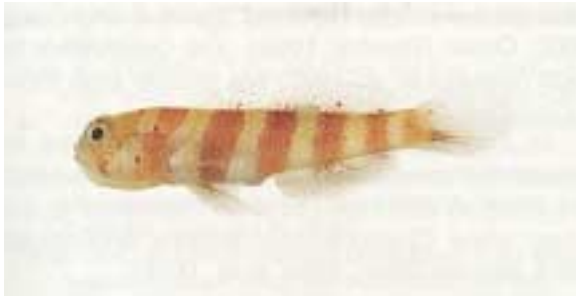

Fig. 11. *A. wheeleri*, ASIZP 057018, 30.9 mm in SL.

Fig. 13. *A. yanoi*, ASIZP 058099, 60.5 mm in SL.

Distribution: Indo-Pacific area, from Red Sea to Samoa.

Remarks: This species was identified from an underwater photo (Fig. 10). Specimen is not available.

Amblyeleotris wheeleri (Polunin and Lubbock, 1977)

(Figs. 11, 12)

Cryptocentrus wheeleri Polunin and Lubbock, 1977: 88 (Aldabra Atoll, Seychelles).
Amblyeleotris fasciata: Lee, 1993: 533, pl. 178-8.

Materials: Two specimens, ASIZP 056121, 34.1-40.5 mm in SL., 17 Mar. 1985, Tantzuwan, 8 m; 1 specimen, ASIZP 056122, 34.8 mm in SL., 19 Mar. 1986, Tantzuwan, 8 m; 1 specimen, ASIZP 057018, 30.88 mm in SL, 19 Apr. 1994, Taiping Is. (Spratly Is.), 16 m.

Diagnosis: D VI-I,12; A I,12, P_1 18-19; LR 65-70, TR19-21; Pred S 20-21. HL 3.2-3.6, BD 4.8-5.2, Pred L 2.6-2.8, SD_2L 1.6-1.8, SAL 1.7-1.9 all in SL. SnL 6.0-6.5, ED 3.5-3.8, Int 13.7-15.2 all in HL.

Maxillary reaching rear edge of eye. Head naked, 20 to 21 small scales on median part of nape. Caudal fin rounded. Body pale yellow with 5 broad dark-reddish transverse bands. Anal fin with a dark longitudinal band with its distal part transparent. Dorsal fin with some orange-red spots.

Remarks: The present species was misidentified as *A. fasciata* (Herre) previously (Shao et al. 1987), after rechecking the specimens collected before. We have not yet found a true specimen of *A. fasciata* (Herre) from Taiwanese waters.

Distribution: Indo-West Pacific species. This is the most abundant *Amblyeleotris* species in Taiwan, occurring around Taiwan except the sandy western coast.

Amblyeleotris yanoi Aonuma and Yoshino, 1996

(Fig. 13)

Amblyeleotris yanoi Aonuma and Yoshino, 1996: 163 (Okinawa, Japan)

Material: One specimen, ASIZP 058099, 60.5 mm in SL., 4 Jun. 1993, Shanhai, Pingtung Co., 16m depth.

Diagnosis: D VI-I,13; A I,13, P_1 18; P_2 I,5; LR 98; TR 29; Pred S 0; HL 4.1; BD 7.5; HW 11.3; Pred L 4.6; SD_2L 2.7; AL 2.6; CPD 13.35 all in SL. ED 4.6, Int 11.9, SnL 6.6 all in HL.

Mouth oblique, maxillary reaching point of midline of eye or a little beyond. Snout obtuse. Body elongate and compressed. Scales on body small cycloid anteriorly, becoming larger and ctenoid posteriorly. Head and nape naked. No frenum; membrane connected only on basal part of 5th rays in adults. Third and 4th spines of 1st dorsal fin longest. Second dorsal and anal as high as 1st dorsal. Fresh color of body pale yellow with 5 orange-brown bands. The 5th bands fused with medial caudal stripe. Pectoral and pelvic fins translucent. Dorsal and anal fins yellow with pale network. Caudal fin yellow with medial and upper orange stripes, each edged with blue margin. Color in alcohol, body pale yellow, with 4 brown dorsal bars. Dorsal, pectoral, pelvic, and anal fins translucent. Two orange caudal stripes faded to translucent with darkened edges which are bluish when fish is alive.

Distribution: This species was recently described as a new species by Aonuma and Yoshino (1996). The Ryukyu and Indonesia were the only 2 localities where specimens were collected. It is a new record for Taiwan.

DISCUSSION

Several genera of gobiid fishes are symbiotic with snapping shrimp of the genus *Alpheus*. These gobies assigned to the genera *Amblyeleotris* Bleeker, *Cryptocentrus* Valenciennes, *Ctenogobiops* Smith, *Flabelligobius* Smith, *Lotilia* Klausewitz, *Mahidolia* Smith, *Myersina* Herre, *Psilogobius* Baldwin, *Stonogobiops* Polunin and Lubbock, *Tomiyamichthys* Smith, and *Vanderhorstia* Smith are distributed throughout the Indo-Pacific region. The endemic, monotypic genus *Nes* Ginsburg is found only in the West Atlantic. Among the above genera, the genus *Cryptocentrus* is the largest and is comprised of 40 species (Hoese 1986). The genus *Amblyeleotris* is the 2nd largest. However, in most areas, *Amblyeleotris* seems to have more species number than the genus *Cryptocentrus*. For example, the species number of *Amblyeleotris* in the Red Sea (Dor 1984), Indonesia (Kuiter 1992), Maldives (Randall and Goren 1993), Oman (Randall 1995), and Ogasawara Islands (Randall et al. 1997) are greater than those of *Cryptocentrus*.

In Taiwan, our collecting efforts have increased the species number in *Amblyeleotris* from 2 in Shao et al. (1987) to 8 as described in this paper, while *Cryptocentrus* remains unchanged, with 6 species after Shao et al. (1987).

Zoogeographic distributions of these fishes around Taiwan are easily influenced by the Kuro-

shio current. Thus, some widely distributed Indo-West Pacific species are expected to share common occurrence between Japan and Taiwan. The species found in Japan presumably should be found in Taiwan, especially in the waters of southern Taiwan, including Green Is., Lanyu, and Hsiaoliuchiu which the Kuroshio current directly influences. Thus, we expect that the 2 rare and habitat-specialist species *A. randalli* and *A. diagonalis*, may be discovered in Taiwan in the future.

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臺灣產海水鰕虎魚之鈍鯊屬(*Amblyeleotris*)之整理兼記七種新記錄種

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本文係對臺灣海產的鈍鯊屬魚類作分類整理，他們分別是巨鈍鯊(*Amblyeleotris fontanesii*)、斑點鈍鯊(*A. guttata*)、日本鈍鯊(*A. japonica*)、小笠原鈍鯊(*A. ogasawarensis*)、黑斑鈍鯊(*A. periophthalma*)、細環紋鈍鯊(*A. steintzi*)、黑帶鈍鯊(*A. wheeleri*)和矢野氏鈍鯊(*A. yanoi*)。除了斑點鈍鯊外，其餘種均為台灣之新記錄種。文中敘述每種魚的特徵、分布及附註外，並附上標本或生態照片以利參考。

關鍵詞：魚類分類，鰕虎，魚類相，新記錄，臺灣。

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