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Two new species of shrimp gobiid, *Amblyeleotris* (Teleostei: Gobiidae), from the West Pacific

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Two new species of shrimp gobiid, *Amblyeleotris* (Teleostei: Gobiidae), from the West Pacific

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Abstract

Two new species of shrimp goby, genus *Amblyeleotris* Bleeker, 1852, are described herein from the West Pacific. *Amblyeleotris bleekeri*, collected from Taiwan, is distinguished from all congeners by the unique combination of the following features: (1) D1VI; D2 I/13; A. I/14; P 19; LR 62–63; (2) V with very low connecting membrane and lacking frenum; and (3) colouration: head and body of pale white background with five brown bands; interspaces of bands with 111-shaped brown marks; a longitudinal blackish-brown stripe behind orbit and a dark spot behind upper lip. *Amblyeleotris taipinensis*, collected from the South China Sea, is distinguished from all congeners by the unique combination of the following features: (1) D1VI; D2 I/13; A I/14; P 19, LR 73–76; (2) V with very low connecting membrane and lacking frenum; and (3) colouration: snow white body with six straw yellow bands and dorsal side with two rows of tiny black spots.

Keywords: *Pisces Gobiidae*, *Pacific Ocean*, *Amblyeleotris*, *Taiwan*, *new species*

Introduction

The slender shrimp gobiid genus, *Amblyeleotris* Bleeker, 1852, which represents the association between shrimp in coral reef regions, is widely distributed in the Indo-Pacific region. This genus was found to have abbreviated transverse infraorbital sensory papillae (Akihito et al. 1993, 2002) and rather abbreviated, paired row *f* below the lower jaw (Polunin and Lubbock 1977; Miller, pers. comm.). At least 26 nominal species were validated by 2000 (Aonuma and Yoshino 1996; Mohlmann and Munday 1999; Aonuma et al. 2000). However, Randall (1995) listed *Amblyeleotris exilis* (Smith, 1958) as a junior synonym for *Amblyeleotris periphthalma* (Bleeker, 1853). More recently, several species were identified and described from the central and west Pacific; before our present study, there were at least 33 valid species within the genus (Mohlmann and Randall 2002; Randall 2004; Randall and Earle 2006).

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During a survey of marine fish biodiversity in Taiwanese waters and the South China Sea in 1991–1995, we revised our collections of shrimp gobies, *Amblyeleotris* Bleeker, revealing eight previously validated species with seven new records from Taiwanese waters (Chen et al. 1998). Herein, we report and describe two undescribed species of *Amblyeleotris* from northern Taiwan and South China Sea based on our survey of the marine fish fauna. The total count for valid species of the genus in the Indo-Pacific is up to 35. An artificial key to all species of this genus is provided here.

Materials and methods

Measurements follow Miller (1988) and counts follow Chen and Shao (1996), Chen et al. (1999), and Chen and Kottelat (2005). Terminology of cephalic sensory canals and free neuromast organs (sensory papillae) is from Miller (1988) and Wongrat and Miller (1991), based on Sanzo (1911). Vertebral count is based on X-ray radiographs. The length of connecting membrane relative to fifth pelvic fin rays as a CM value follows Aonuma and Yoshino (1996) which is based on the UM value of Yanagisawa (1976). Meristic abbreviations: A, anal; C, caudal; D1, D2, first and second dorsal fins; C, caudal fin; LR, longitudinal scale series; P, pectoral fin; PreD, predorsal scales; TR, transverse scale series; V, pelvic fin; VC, vertebral count. All lengths are standard length (SL). Examined materials are deposited in the Museum of the Research Center for Biodiversity, Academia Sinica, Taipei (ASIZP) and the National Museum of Marine Biology and Aquarium, Pingtung (NMMB P).

Systematics

Amblyeleotris bleekeri new species (Figures 1A and 2)

Materials examined

Holotype. ASIZP 0064286, 57.7 mm SL, 12 m depth, Sogang, Penghu County, Taiwan, 23 April 1991, coll. JP Chen.

Paratypes. NMMB P 7903, 2 specimens, 12.0–14.2 mm SL, 19 m depth, Guihou, Taipei County, Taiwan, coll. JP Chen.

Diagnosis

Amblyeleotris bleekeri is distinguished from all congeners by the unique combination of the following features: (1) meristic features: D1VI; D2 I/13; A I/14; P 19, LR 62–63; TR 21; no predorsal scale; (2) pelvic fin: very low connecting membrane and lacking frenum; and (3) coloration: head and body of pale white background with five vertical brown bands; interspaces of bands with 111-shaped brown marks; a longitudinal blackish brown stripe behind orbit; a deep brown spot behind upper lip; first dorsal fin with several oblique rows of light yellow stripes and caudal fin translucent with a C-shape brown mark.

Description. Body proportions in Table I. Head and body moderately compressed. Eyes large. Mouth large and oblique, maxillary extending to a vertical of posterior margin of

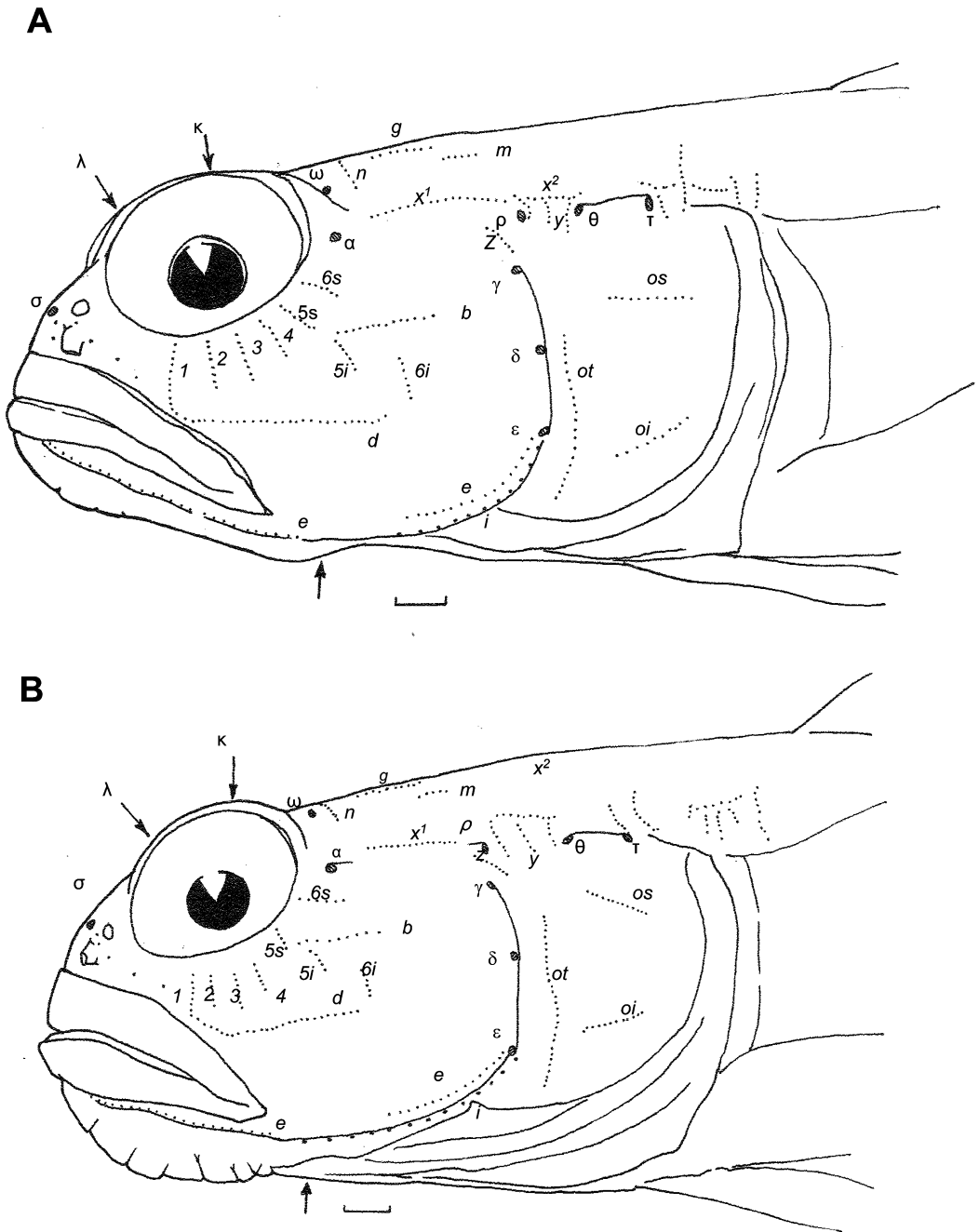


Figure 1. Head lateral-line system of (A) *Amblyeleotris bleekeri*, holotype and (B) *Amblyeleotris taipinensis*, holotype.

orbit. Lower jaws with three to four rows of subconical teeth; outer rows elongated and separated. Inner teeth inwardly curved, two to three large canines on each side. Snout is rather blunt, shorter than orbit. Bony interorbital is very narrow. Gill opening extending

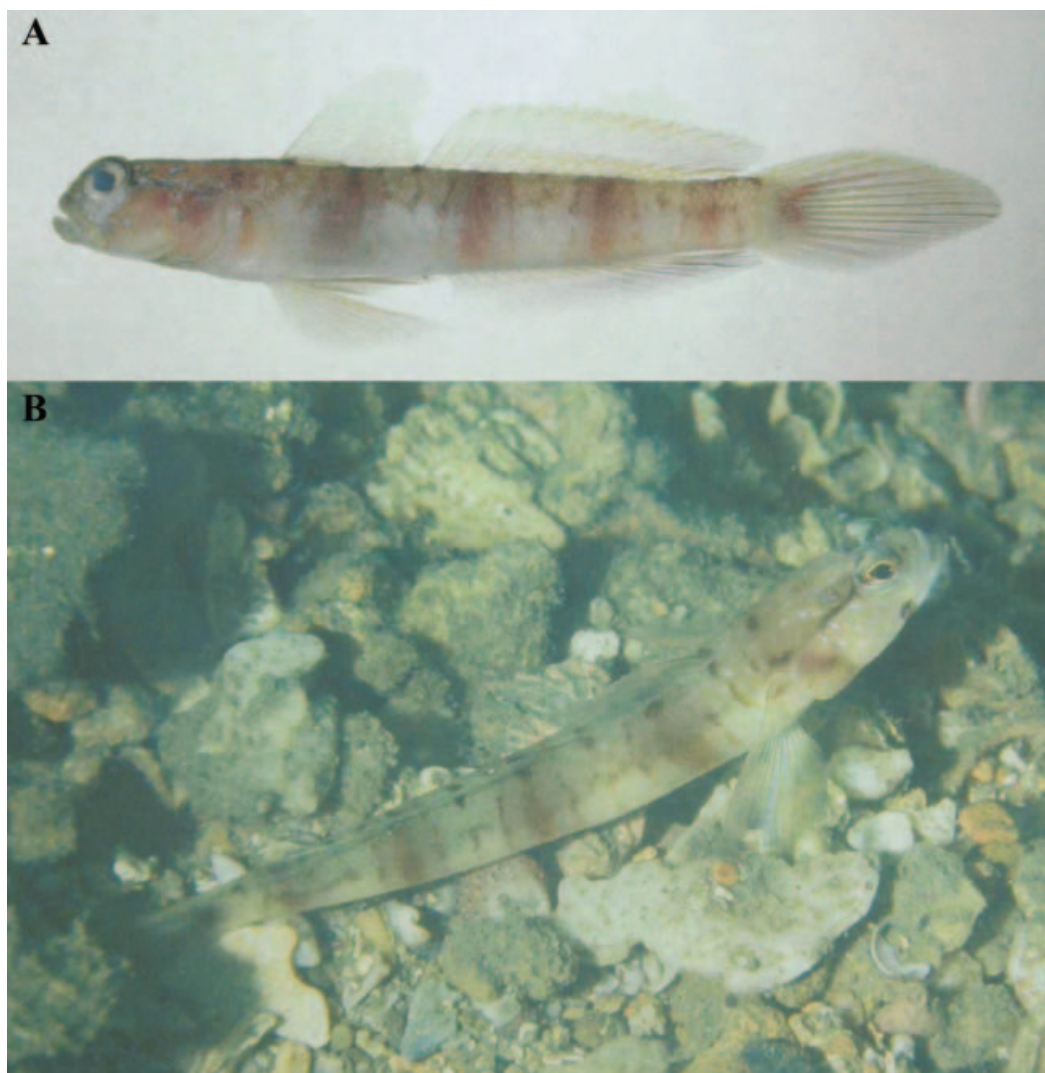


Figure 2. *Amblyeleotris bleekeri* n. sp., (A) 57.7 mm SL, holotype, ASIZP 064286; (B) underwater photo of a live specimen, CA. 60 mm SL, northeastern Taiwan.

forward below posterior margin of orbit. Anterior nostril a short tube. Posterior nostril a round hole. Opercle and preopercle edges smooth. Isthmus narrow. $10+16=26$ vertebrae.

Fins. D1 VI; D2 I/13; A I/14; P 19; V I/5. D1 II, III longest, extending to first branched ray of D2 when depressed. D2 base and A base long, rear tips reaching beyond the upper procurent rays of C. A origin inserted below second branched rays of D2. P large, extending just reaching the edge of anus. C lanceolate. V rather long, extending beyond the origin of A and fourth branched rays longest; the connecting membrane very low, less than $1/10$. No pelvic frenum.

Scales. Body with very small cycloid scales anteriorly and ctenoid scales posteriorly. Longitudinal scale rows 62–63; transverse scale rows 21; predorsal scale 0. Ventral body

Table I. Morphometry of type specimens of two new species.

	<i>A. bleekeri</i> ASIZP64286 Holotype	<i>A. taipinensis</i> ASIZP57110 Holotype
Percentage of SL (%)		
Head length	25.4	28.1
Predorsal length	32.9	32.3
Snout to second dorsal origin	52.6	52.1
Snout to anus	55.2	53.9
Snout to anal fin origin	52.9	51.3
Prepelvic length	26.7	31.4
Caudal penduncle length	18.6	15.7
Caudal penduncle depth	16.8	9.6
First dorsal fin base	19.2	19.2
Second dorsal fin base	33.6	33.1
Anal fin base	32.4	26.4
Caudal fin length	31.6	30.4
Pectoral fin length	19.0	22.5
Pelvic fin length	26.1	26.4
Body depth at pelvic fin origin	16.9	17.5
Body depth at anal fin origin	14.9	15.1
Body width at anal fin origin	7.7	9.7
Pelvic fin origin to anus	22.7	25.7
Percentage of HL (%)		
Snout length	22.3	20.8
Eye diameter	30.3	27.4
Postorbital length	59.3	60.3
Cheek depth	28.8	27.8
Head width in upper gill opening	33.9	49.1
Head width in maximum	48.4	38.9
Fleshy interorbital width	12.1	11.9
Bony interorbital width	6.6	7.1
Lower jaw length	45.2	41.1

covered with rather small cycloid scales. Midline of nape naked. Scales on sides extend forward approximately to the midline edge of the opercle. Scales absent on opercle, cheek and pectoral fin base.

Head lateral-line system (Figure 1A). Canals: anterior oculoscapular canal with paired terminal pore σ , single pore λ and single pore κ on interorbital region, paired ω behind orbit; and paired lateral side of canals with pores α , β , and terminal pores ρ . Posterior oculoscapular canal with two terminal pores θ and τ . Preopercular canal with pores γ , δ and ε .

Sensory papillae. Six main transverse rows of papillae, row 1, 2, 3, 4 vertical. Row 5 and 6 separated as row 5s, 5i and 6s, 6i respectively. Row b short. Row d rather long. Row f paired. Other papillae shown in detail in Figure 1.

Colouration in life (Figure 2). Head and body of pale white background with five brown bands, which are deeper in middle region. The first band on the opercle; the second one below first dorsal fin base; the third band and fourth one under second dorsal fin base; fifth band on caudal peduncle. Dorsal side with a series of eight brown spots from nape to

caudal fin base, each composed of two separated, symmetrical spots along both sides of two dorsal fin bases. The interspaces between lateral brown bands consist of three vertical brown lines forming a 111-shape; the middle row shorter and somewhat zigzagged, and shorter than anterior and posterior rows. A row of round brown spots from upper gill opening to caudal fin; the first shoulder spot seems to be more conspicuous than the remaining brown spots on the 111-shaped line just above longitudinal midline on body. Dorsal half of body light pale brown. Two greyish-brown marks on inter-orbital side of eyeballs. Cheek with several light blue spots, a conspicuous, thin longitudinal blackish-brown stripe behind orbit extending along lateral region of oculoscapular canal to upper gill opening. Opercle with a deep brown mark in upper half. A round deep brown spot just behind upper lip. Snout with a pair of brown spots. First dorsal fin with several oblique rows of light yellow stripes with alternative pale stripes. Second dorsal base with a very light greyish-purple band with about 35 round yellow spots arranged as two to three rows. Pectoral fin pale white and pectoral fin base with a vertical orange stripe and a conspicuous deep brown spot on upper region. Anal fin white and distal region purple grey with two to three light yellow spots. Caudal fin translucent with a C-shaped brown mark. Pelvic fin light greyish-yellow.

Distribution

This new species has only been found in the coastal regions off northeastern Taiwan and the Penghu islands.

Etymology

The new species is named after the famous Dutch ichthyologist, Dr. P. Bleeker who has made significant contributions to Indo-Pacific fish research and also created this marine gobiid genus *Amblyeleotris*.

Remarks

The new species is more similar to the Japanese species *Amblyeleotris masuii* Aunoma and Yoshino, 1996 than to any other congener by overall colouration pattern. However, *Amblyeleotris bleekeri* is well distinguished from *Amblyeleotris masuii* by the following combination of features: (1) longitudinal scale rows: 62–63 versus 92–97; (2) shape of first dorsal fin: II, III longest versus all about equal; (3) anal fin rays: 14 versus 13; (4) pelvic fin: frenum absent and very low CM (<1/10) versus frenum present and CM 0.4–0.7; and (5) head colouration: a longitudinal blackish-brown stripe behind orbit and a round deep brown spot just behind upper lip versus no such marks.

This new species is also somewhat similar to the central Pacific species *Amblyeleotris rubrimarginata* Mohlmann and Randall, 2002 by the value of fin rays counts and low CM value. However, *Amblyeleotris bleekeri* is well distinguished from *Amblyeleotris rubrimarginata* by the following combination of features: (1) longitudinal scale rows: 62–63 versus 77–94; (2) pelvic fin: frenum absent versus frenum present; (3) fin colouration: D2 with thin distal brown margin and no shiny spots on D2 and C versus a conspicuous red margin or rows of small red spots on D2 and C. *Amblyeleotris bleekeri* also shares similarities in some colouration patterns as well as dorsal and anal fin rays counts with *Amblyeleotris triguttata* Randall, 1994. *Amblyeleotris bleekeri* is easily distinguished from *Amblyeleotris triguttata* as

follows: (1) pectoral fin rays: 19 versus modally 20; (2) longitudinal scale rows: 62–63 versus 96–104; and (3) colouration: first dorsal fin in lacking large mark versus first dorsal fin in having a red-edged black blotch at base.

***Amblyeleotris taipinensis* new species**
(Figures 1B and 3)

Materials examined

Holotype. ASIZP 057110, 44.2 mm SL, 15 m depth, Nansa, Taipin Island, South China Sea, 20 April 1994, coll. JP Chen.

Diagnosis

Amblyeleotris taipinensis is distinguished from all congeners by the unique combination of the following features: (1) meristic features: D1 VI; D2 I/13; A I/14; P 19; LR 73–76; TR 28; no predorsal scale; (2) pelvic fin: very low connecting membrane and lacking frenum; and (3) colouration: snow white body with five straw yellow bands and dorsal side of body with two rows of tiny black spots; spotless on cheek; no horizontal dark bar behind eye; first dorsal and second dorsal fins with two longitudinal rows of greyish-purple stripes; pectoral fin base with a narrow vertical straw-yellow band; caudal fin translucent and somewhat straw yellow in the middle.

Description. Body proportions in Table I. Head and body moderately compressed. Eyes large. Mouth large and oblique, maxillary extending to vertical of posterior margin of pupil. Lower jaws with three to four rows of subconical teeth; outer rows elongated and separated. Inner teeth inwardly curved, one to two large canines. Snout is rather blunt, shorter than orbit. Bony interorbital is very narrow. Gill opening extending forward below posterior margin of orbit. Anterior nostril a short tube. Posterior nostril a round hole. Opercle and preopercle edges smooth. Isthmus narrow. $10+16=26$ vertebrae.

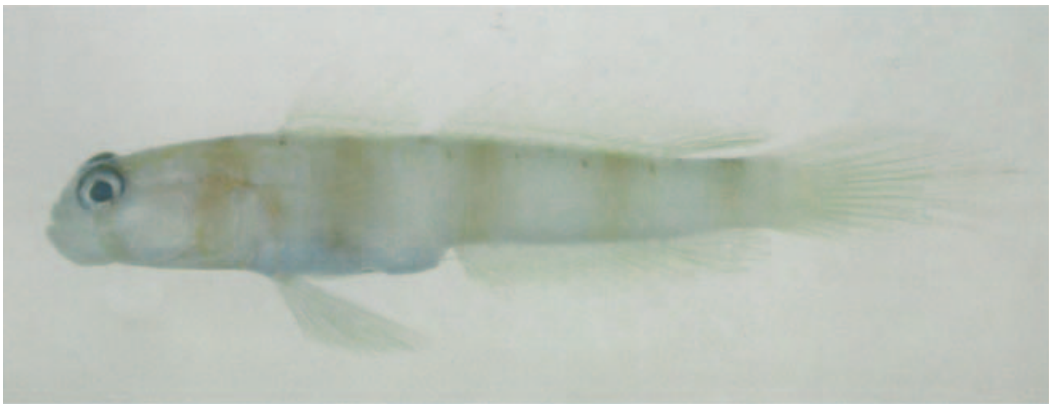


Figure 3. *Amblyeleotris taipinensis*, holotype, ASIZP 057110, 44.2 mm SL, Nansa, Taipin Island, South China Sea.

Fins. D1 VI; D2 I/13; A I/14; P 19; V I/5. D1 II, III longest, extending to first branched ray of D2 when depressed. D2 base and A base long, rear tips just reaching the upper procurent rays of C. A origin inserted below first branched rays of D2. P large, extending almost to the edge of anus. C lanceolate. V rather long, extending beyond the origin of A and fourth branched rays longest; the connecting membrane very low, less than 1/10. No frenum.

Scales. Body with very tiny cycloid scales anteriorly, and ctenoid scales posteriorly. Longitudinal scale rows 73–76; transverse scale rows 28; predorsal scale 0. Ventral body covered with rather tiny cycloid scales. Midline of nape naked. Scales on sides extending forward above opercle. Scales absent on opercle, cheek and pectoral fin base.

Head lateral-line system (Figure 1B). Canals: anterior oculoscapular canal with paired terminal pore σ , single pore λ and single pore κ on interorbital region, paired ω behind orbit; and paired lateral side of canals with pores α , β , and terminal pores ρ . Posterior oculoscapular canal with two terminal pores θ and τ . Preopercular canal with pores γ , δ , and ε .

Sensory papillae. Six main transverse rows of papillae, row 1, 2, 3, 4 vertical. Row 5 and 6 separated as row 5s, 5i and 6s, 6i, respectively. Row *b* short. Row *d* rather long. Row *f* paired. Other papillae shown in detail as Figure 1B.

Colouration in life. Colouration based on the unique holotype (Figure 3). Head and body snow white, body with five wide, vertical light straw-yellow bands. Nape entirely straw yellow. The band on head narrower, below orbit on cheek extending to lip corner. The first wide dorsal band from nape to opercle. Second band just below first dorsal fin base. Third band on anterior region below second dorsal fin and fourth band below posterior region of second dorsal fin. Fifth band on caudal fin peduncle. No distinct spots on cheek. A pair of brownish-black spots along first dorsal fin base; two rows of brownish-black spots behind first dorsal fin base to caudal peduncle along dorsal midline, first row with three on upper side near dorsal fin bases, second row with four such spots just below first row. First dorsal and second dorsal fins with two thin, longitudinal rows of greyish-purple stripes on basal region, and a pink longitudinal midline between them. Pectoral fin base with a narrow vertical straw yellow band. Caudal fin translucent and somewhat straw yellow in middle rays.

Distribution

So far, this new species has only been found near Nansa Isles: Taipin Island (also referred to Spratly Island) in the South China Sea.

Etymology

The specific name, *taipinensis* refers to the locality at which the species was found, Nansa Isles, Taipin Island, in southern region of the South China Sea.

Remarks

This species is more similar to *Amblyeleotris arcupinna* than any other congeneric species by the colour pattern, both with five dark bands on the body and a series of semi-paired

dots in the white interspaces along dorsal body. *Amblyeleotris taipinensis* is different from *Amblyeleotris arcupinna* by: (1) first dorsal fin: no arched mark versus blackish-orange arched mark; (2) longitudinal scale rows: 73–76 versus 103–111; (3) body bands: straw yellow versus blackish-brown. This new species is more similar to *Amblyeleotris japonica* Tanaka, 1957 than to any other congeneric species by meristic features. However, *Amblyeleotris taipinensis* is well distinguished from *Amblyeleotris japonica* by the following combination of features: (1) dorsal fins: basal stripes and lacking spots versus many small dark spots; (2) pelvic fin: lacking frenum versus having frenum; (3) caudal fin: no such mark versus deep brown horseshoe mark; and (4) body bands: straw yellow versus deep brown. This new species is also somewhat similar to *Amblyeleotris harrisorum* Molmann and Randall, 2002. However, they can be easily distinguished as follows: (1) longitudinal scale rows: 73–76 versus 81–96; and (2) colouration: head with a vertical straw yellow band below eye versus oblique yellow lines behind eye; six lateral straw yellow bands covering at least 70–100% of vertical region versus only four lateral bands covering most of upper half of head and body; two series of tiny black spots on dorsal side versus no such marks.

Key to nominal species of *Amblyeleotris* in the Indo-Pacific

1. Body with three lateral, vertical bands or fewer, even without band, posterior part of body scattered with large orange spots 2
- Body with four or five lateral, vertical bands or oblique bars, posterior part of body without such orange spots 3
2. Body without vertical bands, abdomen with black marks *A. guttata* (Fowler, 1938)
- Body with three vertical bands, abdomen without such black mark *A. rhyax* Polunin and Lubbock, 1979
3. First dorsal fin with one large black ocellus which larger than eye *A. randalli* Hoese and Steene, 1978
- First dorsal fin without such large dark ocellus 4
4. Dorsal half of body with yellow marks 5
- Lateral body without such yellow marks 7
5. Several golden vertical bands on abdomen, longitudinal scales series about 50 *A. delicatulus* Smith, 1958
- No golden vertical bands on abdomen, longitudinal scales series more than 69 6
6. Three golden vertical bands on head, longitudinal scales series 69–75, pelvic frenum present *A. callopareia* Polunin and Lubbock, 1979
- One oblique yellow line on nape, longitudinal scales series 81–86, pelvic frenum absent *A. harrisorum* Mohlmann and Randall, 2002
7. Outline of coloured bands on body indistinct *A. periophthalma* (Bleeker, 1853)
- Outline of coloured bands on body well distinct 8
8. Head entirely greyish-black *A. melanocephala* Aonuma, Iwata and Yoshino, 2000
- Head without deep pigmentation on background 9

9. Caudal fin with orange or red candle flame-shaped marking 10
- Caudal fin without such marking 11
10. Longitudinal scales series 64–82, a large red spot between dorsal soft rays 12 and 13, three ocellus spots above central flame-shape marking on caudal fin *A. aurora* Mohlmann and Munday, 1999
- Longitudinal scales series 95–103, no red spots on dorsal soft rays 12 and 13, one band along upper margin of caudal fin *A. yanoi* Aonuma and Yoshino, 1996
11. Lateral bands broader than light interspace 12
- Lateral bands about equal to or narrower than light interspace 14
12. Longitudinal scales series 50–57 *A. fasciata* (Herre, 1953)
- Longitudinal scales series more than 80 13
13. Frenum absent, upper half of white interspace each with a reddish brown bar *A. marquesas* Mohlmann and Randall, 2002
- Frenum present, upper half of interspace without bar *A. latifasciata* Polunin and Lubbock, 1979
14. Dark backward-slanting oblique line behind eye *A. diagonalis* Polunin and Lubbock, 1979
- No dark backward-slanting oblique line behind eye 15
15. White interspaces with irregular dark lines, sometime formed reticulations 16
- White interspaces with straight dark lines or without lines 19
16. Longitudinal scales series 62–63; first dorsal fin triangular, second and third dorsal spines longest; frenum absent ***A. bleekeri* new species**
- Longitudinal scales series more than 90; first dorsal fin rectangular, second to fifth dorsal spines longest; frenum present 17
17. Longitudinal scales series 92–97; transverse scale series 25–28; no dark bar below eye, a pair of spots on chin *A. masuii* Aonuma and Yoshino, 1996
- Longitudinal scales series more than 96; transverse scale series more than 32; a dark bar below eye, no spots on chin 18
18. Anal fin rays I/14–15; a dark spot on first dorsal fin base; first dorsal fin ray lacking prolonged rays in male *A. triguttata* Randall, 1994
- Anal fin rays I/13; no dark spot on first dorsal fin base; third to fifth dorsal rays of first dorsal fin as short filament in male *A. neumanni* Randall and Earle, 2006
19. A dark horizontal line behind the rear margin of eye 20
- No dark horizontal line behind the rear margin of eye 21
20. Second dorsal fin rays I/12–13; anal fin rays I/18; 4th dorsal spine longest and prolonged *A. macronema* Polunin and Lubbock, 1979
- Second dorsal fin rays I/17–19; anal fin rays I/18–19; 3rd dorsal spine longest and not prolonged *A. gymnocephala* (Bleeker, 1853)
21. Frenum absent 22
- Frenum present 29

22. Anal fin rays I/12; longitudinal scales series less than 72, transverse scale series less than 25 22
- Anal fin rays I/13; longitudinal scales series more than 72, transverse scale series more than 25 23
23. Second dorsal fin rays I/13; longitudinal scales series 70; vertical coloured bands on body narrow, less than 1/3 of white interspaces; a dark red spot just over the rear of the maxillary *A. katherine* Randall, 2004
- Second dorsal fin rays I/12; longitudinal scales series 64; vertical coloured bands on body wide, more than 1/3 of white interspaces; no such red spot over the rear of the maxillary *A. steinitzi* (Klausewitz, 1974)
24. A series of semi-paired dark dots in white interspaces along dorsal body 24
- No such dots in white interspaces along dorsal body 26
25. Longitudinal scales series 103–111; first dorsal with blackish-orange arced marking *A. arcupinna* Mohlmann and Munday, 1999
- Longitudinal scales series 73–76; first dorsal without blackish-orange arced marking 25
26. Predorsal scales 21; bars on body oblique; gill opening not extending forward below posterior margin of orbit *A. stenotaeniata* Randall, 2004
- No predorsal scale; bars on body vertical; gill opening extending forward below posterior margin of orbit ***A. taipinensis* new species**
27. Second dorsal fin rays I/13; longitudinal scales series more than 80 27
- Second dorsal fin rays I/14; longitudinal scales series 73 *A. novaecaledoniae* Goren, 1981
28. Gill opening narrow, only extending to vertical of rear margin of preopercle; caudal fin brownish-red, except upper and lowest few rays *A. bellicauda* Randall, 2004
- Gill opening rather wide, extending forward beyond the rear margin of preopercle; caudal fin white with coloured marks 28
29. Caudal fin has a large elliptical mark; no spot on the upper part of opercle and middle of first dorsal-fin base *A. ellipse* Randall, 2004
- Caudal fin has not elliptical mark; a spot on the upper part of opercle and middle of first dorsal-fin base *A. ogasawarensis* Yanagisawa, 1978
30. Red margin on the dorsal fin and the black spot behind the eye *A. rubrimarginata* Mohlmann and Randall, 2002
- No red margin on the dorsal fin and the black spot behind the eye 30
31. Second dorsal fin rays I/16; longitudinal scales series 116–129 *A. downingi* Randall, 1994
- Second dorsal fin rays I/13–15; longitudinal scales series less than 113 31
32. Second dorsal fin rays I/14–15; anal fin rays I/15–17 *A. fontanesii* (Bleeker, 1852)
- Second dorsal fin rays I/13–14, anal fin rays I/13–14 33
33. Anal fin rays I/14; longitudinal scales series 69–78 *A. japonica* Takagi, 1957
- Anal fin rays I/13; longitudinal scales series 102–108 34

34. Dark blue spot on the dorsal fin; a pair of large black spots on chin; fifth dorsal ray of first dorsal fin longest *A. biguttata* Randall, 2004
- No dark spot on margin of the dorsal fin; no such black spot on chin; third or fourth dorsal ray of first dorsal fin longest *A. sungami* (Klausewitz, 1969)

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