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Second appearance of the burrowing goby *Trypauchen vagina* (Bloch & Schneider, 1801) in the marine waters of Iraq

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Abstract: The burrowing goby *Trypauchen vagina*, is recorded from the marine waters of Iraq. It is described on the basis of 7 adult specimens, 123-185 mm total length. This account represents the second appearance of this species in about 27 years. Accordingly, the species is miss-observed in the Iraqi waters. The total and standard lengths are compared with specimens caught from the area.

Résumé : *Seconde apparition du gobie fouisseur* Trypauchen vagina *(Bloch & Schneider, 1801) dans les eaux marines d'Irak.* Le gobie fouisseur *Trypauchen vagina* a été enregistré dans les eaux marines d'Irak. Il est décrit sur la base de 7 spécimens adultes de longueur totale de 123-185 mm. Cette étude représente la deuxième apparition de cette espèce en environ 27 ans. En conséquence, l'espèce est non-observée dans les eaux iraquiennes. Les longueurs totales et standard ont été comparées aux specimens récoltés dans la zone.

Keywords: Range extension ● Iraq ● Basrah ● Arabian Gulf ● Sustainable population

Introduction

Gobies (Gobiidae) are among the largest families of the acanthomorph group. This family contains at least 1763 species belonging to 170 genera, with many more species yet to be described (Eschmeyer, 2016). Gobies are found worldwide, in marine, estuarine and freshwater habitats (Thacker & Roje, 2011).

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Gobius vagina was described for the first time by Bloch & Schneider (1801) based on a single specimen from Tranquebar, India (Murdy, 2006). Although their description was concise, Bloch & Schneider (1801) indicated that an oval-shaped opening was present on the dorsal edge of the operculum. The erection of the genus *Trypauchen* [from the Greek trypa (hole) and auchen (neck)] by Valenciennes in Cuvier & Valenciennes (1837) is due to the presence of this anatomical peculiarity. This pouch with an unknown function is only found in the following genera of Amblyopinae: *Amblyotrypauchen*,

Ctenotrypauchen, *Trypauchen*, and *Trypauchenichthys* (Murdy, 2006). The genus *Trypauchen is* comprised of two species: *T. pelaeos* and *T. vagina* (Murdy, 2006)

Trypauchen vagina has been recorded from several locations in the Indo-Pacific: India (Hora, 1924); Thailand (Fowler, 1935; Smith, 1945); Singapore (Larson & Lim, 2005); Mekong River (Rainboth, 1996); various parts of Indonesia (Kottelat et al., 1993); China (Rendahl, 1924; Herre, 1927); Taiwan (Chen & Fang, 1999), but its presence in the Israeli coasts of the Mediterranean Sea (Salameh et al., 2010) and the Iskenderun Bay, North-Eastern Mediterranean Sea (Akamca et al., 2011) suggested that there is a high probability of this species being present in the Red Sea.

This species is reported from only two localities in the Arabian Gulf area, Iraq by Hussain et al. (1988) and Kuwait by Houde et al. (1986) and Murdy (2006). A number of specimens are also housed in several museums (www.fishnet2.net). We report herein a second record of *T. vagina* in the marine waters of Iraq.

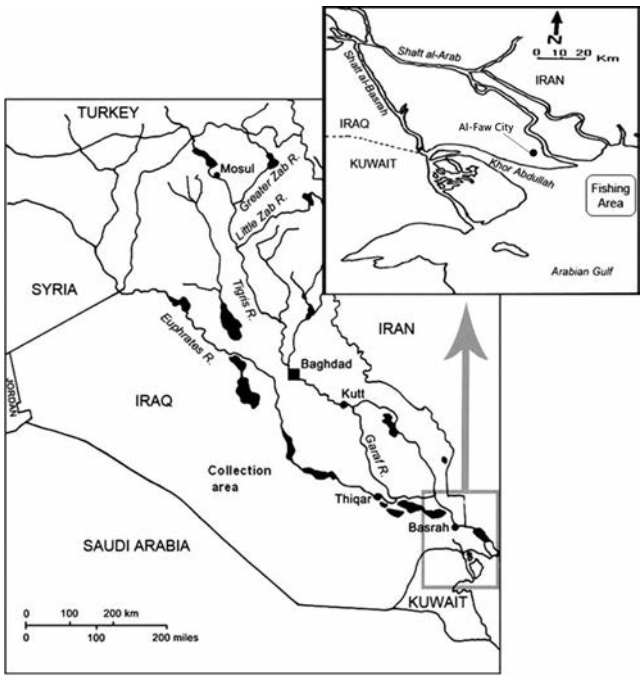

Figure 1. *Trypauchen vagina.* Map showing capture points in the Iraqi marine waters, Basrah, Iraq.

Material and methods

On May and September 2015, a catch of burrowing goby (n = 7, 123-185 mm TL) were recorded from off the coast of Fao City and Khor al-Zubair area, Basrah, northwestern corner of the Arabian Gulf (29°47'55.71"N-48°43'32.9"E) (Fig. 1). The specimens were obtained using a small commercial fish trawl. The specimens were deposited at the fish collection of the Marine Science Centre, University of Basrah, Iraq (MSC) (Fig. 2). Morphometric and meristic characters were recorded following Murdy (1989), and Murdy & Shibukawa (2001) and are presented in Table 1. Length measurements were determined using dial calipers. After measuring, fish were fixed in 10% formalin and stored in 70% ethanol. Eschmeyer (2016) and Fricke (2016) were used for the taxonomic status of the species, spelling of species names, and taxonomic references respectively.

Figure 2. *Trypauchen vagina*. Representative individuals of the population from the Iraqi marine waters, Basrah, Iraq.

Results

Collected specimens of *Trypauchen vagina* were characterized by the following features: 1) compressed and slender body; 2) head small with upper profile slightly convex; 3) a median crest that originates opposite the anterior edge of orbit and ends just before the middle of predorsal fin distance; 4) two smaller crests found at each side of the large crest; 5) oblique mouth reaching to the anterior edge of orbit; 6) slightly protruded lower jaw; 7) large curved canine teeth in both jaws with small teeth in the inner row; 8) the orbit with a large cavity covered with skin layer and with very small rudimentary eyes; 9) interorbital space narrow; 10) pouch small and with a horizontal slit-like opening located near the dorsal margin of operculum; 11) dorsal fin very long with 5 flexible spines that are confluent with caudal fin; 12) anal fin rays confluent with caudal fin; 13) pointed caudal fin and pectoral fin crescent shaped; 14) origin of pelvic fin positioned under pectoral fin base, small funnel shape pelvic fin with interradial membrane; 15) cycloid scales on body and abdomen with very small scales; 16) head and

Table 1. *Trypauchen vagina.* Morphometric and meristic characters collected in May and September 2015 from the marine waters of Iraq. Length ranges in mm (% in SL in brackets).

Morphometric/ meristic characters (mm)	Range (% SL) *n* = 7
Total length	123-142
Standard length	115-135 (93.5-95.1 % TL)
Body depth	10.9-14.7 (9.3-11.0)
Body width	6.0-7.9 (2.8-5.5)
Head length	17.5-21.7 (15.6-16.0)
Head depth	11.8-14.2 (10.5-10.9)
Head width	6.8-10.4 (5.7-7.9)
Snout length	3.1-5.6 (2.9-4.6)
Eye diameter	1.5-2.1 (1.5-1.9)
Interorbital distance	2.4-2.8 (2.4-2.9)
Dorsal fin length (2)	97.9-112.0 (85.4-82.5)
Anal fin length	73.9-86.9 (64.5-65.0)
Pectoral fin length	3.6-6.0 (3.3-4.7)
Pelvic fin length	3.8-7.3 (3.6-5.9)
Caudal peduncle depth	4.5-7.2 (4.1-5.7)
Dorsal fin rays	52-54
Anal fin rays	43-47
Pectoral fin rays	15-16
Pelvic fin rays	7-7
Gill rakers	0

body red in color; 17) fins translucent except for pectoral fin; 18) body color is red, light red and pinkish. Head of specimens is red and the tip of the mouth of all specimens was reddish. Reddish edge of the operculum and whole head side were seen in some specimens. One specimen showed off-white caudal fin (Fig. 2). Body measurements and count coincide with those given for this species by Randall (1995), Rainboth (1996), and Murdy (2006).

Discussion

Chronologically, the Iraqi record is considered the second record from the Arabian Gulf area. For the last 28 years and in spite of several ichthyological surveys in the Iraqi marine waters that brought about new records of several fish species (Al-Mukhtar et al., 2011; Jawad et al., 2014; Jawad, 2015), the appearance of *T. vagina* may be observed, but not documented (personal observation, James M. Bishop). In the present study, we document *T. vagina* in the Iraqi marine waters. With the collection of seven adult specimens of this species, it is possible to consider that a sustainable population of *T. vagina* has been established since its first appearance in 1988.

The range of the standard length (115-135 mm) of the specimens collected is smaller than that given by Murdy (2006) for specimens examined from several locations around the world. The specimen collected from the Mediterranean Sea is also larger than our specimens (Salameh et al., 2010), but is larger than the two specimens collected from Kuwait (80.32-94.2 mm) (Murdy, 2006). Such differences might indicate a different species, which needs further investigation. The other morphometric measurements and meristic counts are in agreement with those given by Murdy (2006) and Salameh et al. (2010) (Table 1).

Murdy (2006) suggested that the members of the genus *Trypauchen* have the following set of characters: four, rarely three, anal-fin pterygiophores anterior to the first hemal spine; pelvic fins small, united, and funnel-shaped with a well-developed interradial membrane; and abdomen scaled. Murdy (2006) concluded that *Trypauchen* comprises two species: *T. pelaeos* and *T. vagina*. Koumans (1953) suggested that *T. vagina* can be separated from its recognized congeners in pelvic fin structure, scalation, and osteology.

The colour pattern of the specimens obtained in the present study showed variation and differs from that given for Cochin, India specimen shown by Randall (1995) and from those collected from Mekong Delta, Vietnam shown by Murdy (2006). No reddish cheeks were observed as those shown by Randall's (1995) and Salameh's et al. (2010) specimens. Such differences in color pattern could be due to geographical variations (Salameh et al., 2010).

Randall (1995) has included *T. vagina* in his book about coastal fishes of Oman, but the image of the specimen shown in his book is for a specimen taken from Cochin, India (Randall, 1995, page 409). This means that the presence of this species from the Omani waters is not confirmed. Further investigations are required to reveal its presence in this part of the world. It is up till now, this species has not been reported from the Red Sea, but its presence in the Israeli coasts of the Mediterranean Sea (Salameh et al., 2010) and the Iskenderun Bay, North-Eastern Mediterranean Sea (Akamca et al., 2011) suggested that there is a high probability of this species being present in the Red Sea. The burrowing behaviour of *T. vagina* and remaining near its burrow makes it difficult to detect and collect (Murdy, 2006). The disappearance of this species from the Iraqi marine waters for the last 28 years could be attributed to such behaviour. In addition, the climatic, hydrological and ecological changes that taken place in the area during this period of time might have contributed to its disappearance (Beg & Al-Ghadban, 2003; Bishop et al., 2016). Thus, the present record can be considered important for the understanding of zoogeographical patterns in the area.

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