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First Record of Streaked Rabbitfish *Siganus Javus* (L., 1766) from the Iraqi Marine Waters, with Re Description of White-Spotted Rabbitfish *Siganus Canaliculatus* (Park, 1797)

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Abstract

Two Siganid fishes were described in the current study, the first one is *Siganus javus* (Linnaeus, 1766) as a new record and the other *Siganus canaliculatus* (Park, 1797), which was collected from the Iraqi marine waters. The samples were collected during December 2018. Streaked rabbitfish *S. javus* is diagnosed by a deep body, 54.01% in standard length, depth of caudal peduncle, 7.27%, total gill rakers 19 and silvery blue undulating lines on mid and lower sides of the body. Whereas the body depth of White-spotted rabbitfish *S. canaliculatus* was 39.08-42.66%, Caudal peduncle depth ranged from 5.21 to 5.66%, total gill rakers ranged from 22 to 24 and it is distinguished by a numerous pearly blue to whitish spots on the nape and trunk.

Keywords: new record, fish, Siganidae, Iraq.

تسجيل اول لاسماك الصافي الجاوي (*Siganus javus* (L., 1766) في المياه البحرية العراقية، مع اعادة وصف لاسماك الصافي القنواطي (*Siganus canaliculatus* (Park, 1797)

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الخلاصة

وصف نوعان من اسماك الصافي في الدراسة الحالية احدهما الصافي الجاوي (*Siganus javus* (L., 1766) كتسجيل جديد والآخر هو الصافي القنواطي (*Siganus canaliculatus* (Park, 1797) في المياه البحرية العراقية. جمعت النماذج في كانون الاول 2018. تميز الصافي الجاوي *S. javus* بالجسم العميق 54.01% الى الطول القياسي، كان عمق السويقة الذنبية 7.27%، العدد الكلي للاسنان الغلصمية 19، واتصف بخطوط متموجة زرقاء فضية على الجانبين الأوسط والسفلي من الجسم. في حين تراوح عمق الجسم في الصافي القنواطي *S. canaliculatus* من 39.08 الى 42.66%، وعمق السويقة الذنبية من 5.21 الى 5.66%، وتراوح العدد الكلي للاسنان الغلصمية من 22 الى 24، وتميز بالبقع المتعددة الزرقاء المبيضة على العنق والجذع.

Introduction

The family Siganidae is composed of one genus (*Siganus*) with 29 species, that are distributed in Indo-Pacific and eastern Mediterranean [1]. Siganids get their common name, rabbitfishes, from their peaceful temperament, rounded blunt snout, and rabbit-like appearance of the jaws. Rabbitfishes are

marine and mainly inhabit reefs, shallow lagoons, sea grasses or mangrove areas. Most siganids are herbivorous. Of all species, 13 are schooling species, while the remainder lives among the coral. Individuals of several species may occur in estuaries for part of their life [2].

Siganidae is distinguished by body laterally compressed, oval, deep, or slender, mouth terminal, very small. Single row of compressed, incisiform teeth in both jaws. Pelvic fins each with two strong spines and three soft rays between them, a character unique to this family. Single dorsal fin with 13 strong spines and 10 soft rays. Anal fin with seven strong spines and nine soft rays. Scales cycloid and very small [3].

Three species are reported in the Arabian Gulf, *Siganus canaliculatus*, *S. javus* and *S. luridus*. The first species is the most common and economically important, whereas the second was less common in the commercial catch and the third was relatively smaller in size [4].

The previous studies appeared existence one siganid species, *S. canaliculatus* in the Iraqi marine waters [5- 8]. In this study, we described *Siganus javus*, as a new record and *S. canaliculatus* from the Iraqi marine waters.

Materials and Methods

Four specimens of rabbitfish fish (one of *S. javus* and three of *S. canaliculatus*) were collected during December 2018 from the marine waters of Iraq, 29° 45' 628"N 48° 39' 748" E (Figure-1), depending on commercial fishery, by using trawl net. The specimens are deposited in the department of Marine Vertebrates, Marine Science Centre, Iraq. The morphological characteristics included eight meristic characters (dorsal fin spines, dorsal fin rays, anal fin spines, anal fin rays, pectoral fin rays, pelvic fin rays and gill rakers) which counted employing dissection microscope, and 18 morphometric characters were measured to the nearest mm by using digital caliper and fish measuring board following [9]. All morphometric measurements were the percentage of standard length.

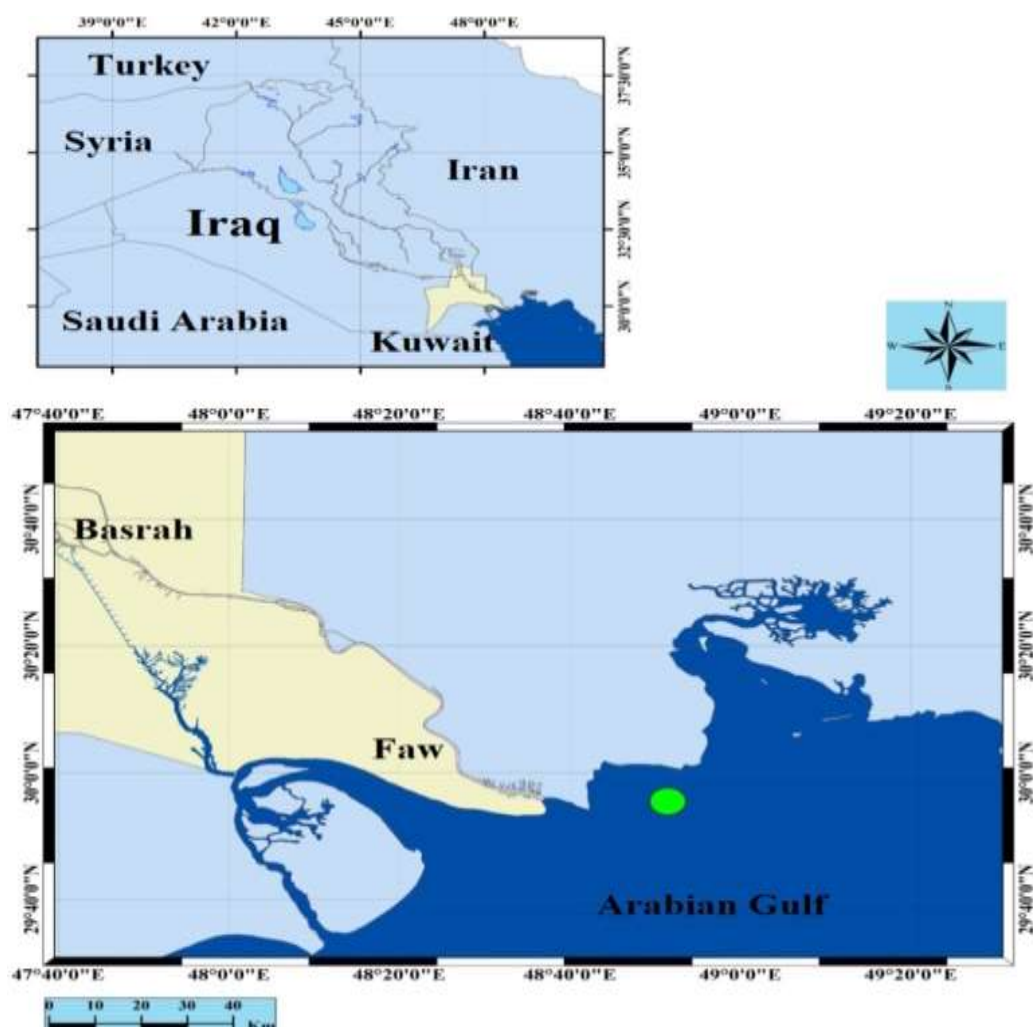


Figure 1- A map showing fishing area in the Iraqi marine waters

Results and discussion

Tables-(1, 2) showed Morphometric and Meristic characteristics of *Siganus javus* as a new record from the Iraqi marine waters, and *Siganus canaliculatus*, which belong to the following classification section:

Class: Actinopterygii

Order: Perciformes

Family: Siganidae

Genus: *Siganus* Forsskål, 1775

Species 1: *Siganus javus* (L., 1766)

Synonym: *Teuthis javus* L., 1766

Amphacanthus javus (L., 1766)

Amphacanthus Javanus (L., 1766)

Siganus java (L., 1766)

Theutis java L., 1766

Species 2: *Siganus canaliculatus* (Park, 1797)

Synonym: *Chaetodon canaliculatus* Park, 1797

Siganus oramin (Bloch & Schneider, 1801)

Amphacanthus dorsalis Valenciennes, 1835

Teuthis dorsalis (Valenciennes, 1835)

***Siganus javus* (L., 1766)**

Systematics

This species was originally described in the genus *Teuthis* L., 1766. Taylor [10] pointed out that *rivulatus* had already been designated as type of *Siganus* by Gill, [11]. Gill's designation in fact made *Siganus* a junior subjective synonym of *Teuthis* L., 1766 because the type of *Teuthis* (*T. javus* L., 1766) is congeneric with the type of *Siganus* [12].

Materials examined

MSCUB, 138 mm SL, northwest of the Arabian Gulf, Iraq, 29° 45' 628"N 48° 39' 748" E, trawl net, December 2018 (Figure-2).

Morphological description

Total length of the specimen was 183 mm, standard length was 138 mm. Body deep, 54.01% in standard length and compressed, 14.52%. Snout short, 11.31%. Head length was 28.99%. Dorsal fin length was 70.91% and its dorsal profile slightly concave above the orbit. Pelvic fin length was 19.97%. Caudal peduncle depth was 7.27%. Dorsal fin with 13 spines followed by 10 rays, fourth to sixth dorsal-fin spine longest. The anal fin had seven spines followed by nine rays, all anal fin spines of similar length and subequal to or slightly shorter than longest anal fin spine. Pelvic fin with two strong spines and three soft rays between them. The total gill rakers were 19. The color of the specimen was back dark bronze, to paler below, numerous metal blue spots on the head and upper sides, silvery blue undulating lines on mid and lower sides of the body.



Figure 2- *Siganus javus* from the Iraqi marine waters.

Signanus canaliculatus (Park, 1797)**Systematics**

This species was originally described in the genus *Chaetodon* L., 1758, which belong to Chaetodontidae. Siganidae is distinguished by Pelvic fins each with two strong spines and three soft rays between them.

Materials examined

MSCUB, 168 mm SL, northwest of the Arabian Gulf, Iraq, 29° 45' 628"N 48° 39' 748" E, trawl net, December 2018 (Figure-3).

Morphological description

The total length of the *S. canaliculatus* ranged from 183 to 228 mm, standard length ranged from 135 to 168 mm. Body compressed 13.32-13.87% in standard length, its depth 39.08-42.66%. Head profile slightly to markedly concave above the eye, its length ranged from 27.02-27.96%. Snout pointed, its length 10.32-11.35%. Caudal peduncle depth ranged from 5.21 to 5.66%. Pelvic fin length ranged from 13.72 to 15.49%. Dorsal fin length ranged from 71.43 to 74.19%, it contained 13 spines followed by 10 rays, fourth to seventh dorsal fin spine longest. Anal fin had seven spines followed by nine rays. Pelvic fin with two strong spines and three soft rays between them. The total gill rakers ranged from 22 to 24. The color was silvery grey above to silvery below with a touch of green on the nape and upper surface of the head, numerous pearly blue to whitish spots on the nape and trunk.

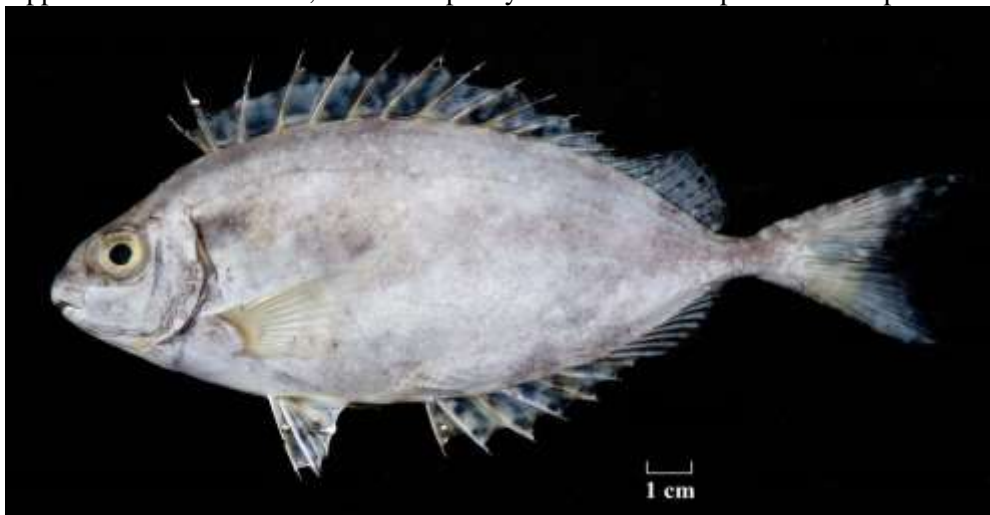


Figure 3- *Signanus canaliculatus* from the Iraqi marine waters.

Table 1- Morphometric characters of *S. javus* and *S. canaliculatus*.

Morphometric characters	<i>S. javus</i>	<i>S. canaliculatus</i>
Total length (mm)	183	183-228
Standard length [SL] (mm)	138	135-168
Body depth % in SL	54.01	39.08-42.66
Body width % in SL	14.52	13.32-13.87
Head length % in SL	28.99	27.02-27.96
Head depth % in SL	27.32	21.89-24.89
Head width % in SL	14.06	11.77-13.24
Snout length % in SL	11.31	10.32-11.35
Eye diameter % in SL	7.87	6.99-7.68
Interorbital distance % in SL	7.54	6.93-7.46
Predorsal length % in SL	28.89	26.98-27.24
Postdorsal length % in SL	6.60	6.36-6.58

fin length% in SL Dorsal	70.91	71.43-74.19
Anal fin length % in SL	46.31	43.41-44.52
Pectoral fin length % in SL	25.12	22.36-26.19
Pelvic fin length % in SL	19.97	13.72-15.49
Caudal peduncle length % in SL	8.68	8.13-9.50
Caudal peduncle depth % in SL	7.27	5.21-5.66

Table 2- Meristic characters of of *S. javus* and *S. canaliculatus*.

Meristic characters	<i>S. javus</i>	<i>S. canaliculatus</i>
Dorsal fin spines	13	13
Dorsal fin rays	10	10
Anal fin spines	7	7
Anal fin rays	9	9
Pectoral fin rays	18	18
Pelvic fin spines	2	2
Pelvic fin rays	3	3
Gill rakers	19	22-24

The environmental impacts may be the cause of range extension of *S. javus* in the Arabian Gulf and the Iraqi marine waters. Some of the environmental changes especially the salinity have always become a change in the composition of the assemblages. The environments of Iraqi marine waters are quite different compared with other parts of the Arabian Gulf. The Shatt Al-Arab River is considered as a major freshwater discharge into the northwest Arabian Gulf, and it plays an important role as feeding, nursery and protective grounds for many fish species [13, 14].

Most of the important characteristics that distinguish between Streaked rabbitfish *S. javus* and White-spotted rabbitfish *S. canaliculatus* are body depth (54.01% in *S. javus*, 39.08-42.66% in *S. canaliculatus*), caudal peduncle depth (7.27% in *S. javus*, 5.21 to 5.66% in *S. canaliculatus*), gill rakers (19 in *S. javus*, 22-24 in *S. canaliculatus*) and The color (silvery blue undulating lines on mid and lower sides of the body in *S. javus*, numerous pearly blue to whitish spots on the nape and trunk in *S. canaliculatus*).

Remarks

Most of the characteristics in our results were consistent with the previous studies, with some differences in ranges of pectoral fin rays and ratio of body depth. Burhanuddin *et al.* [15] described 17 species of the family Siganidae from the coast of Sulawesi, Indonesia. They showed that the dorsal fin of Streaked rabbitfish contained 13 spines and 10 rays, anal fin contained seven spines and nine rays, pectoral fin 15-17 rays, body depth 2.0 to 2.3 times in standard length. Whereas White-spotted rabbitfish had 13 spines and 10 rays in dorsal fin, seven spines and nine rays in anal fin, 17-18 rays in pectoral fin, body depth 2.5 to 2.7 times in standard length.

Conclusions

The present record is a new addition to the marine fish species list for Iraq and indicates that suitable habitat for these species occurs in Iraqi waters.

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