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First record of the Goatfish Species *Parupeneus spilurus* (Perciformes: Mullidae) in the Marine Waters of Syria, Eastern Mediterranean Sea

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ABSTRACT

During our ongoing-research project "Study of the Reproductive Biology and Food Spectrum of the Blue Spotted Cornet Fish *Fistularia commersonii* (Rüppell, 1838) and *Chromis chromis* (Linnaeus, 1758) in Syrian Marine Waters (Governorate of Latakia)," we conducted a dissection of the stomach of *F. commersonii* specimen caught on November 26, 2023. The fish had a total length of 82.6 cm and a weight of 200.24 g. During this examination, we observed and identified the species of goatfish, *Parupeneus spilurus*, which was recorded for the first time in the Syrian marine waters along the Eastern Mediterranean coast.

Keywords: Mullidae, *Fistularia commersonii,* Syrian marine waters.

1. INTRODUCTION

The fish fauna in the Mediterranean Sea is going through extensive changes in both quantitative and qualitative composing, particularly in the eastern Mediterranean. These changes were largely attributed to the introduction of migratory species from the Red Sea via the Suez Canal, as well as from the western Mediterranean (Galyia, 2003; Golani et al., 2006; Othman et al., 2023). The family Mullidae, commonly known as goatfishes, they were widely distributed in tropical, subtropical, and temperate habitats (Uiblein, 2007). This family comprises 101 species belonging to six genera (Echreshavi et al., 2022). Goatfishes are also referred to as "red mullets" and can reach a maximum size of 33 cm. The genus *Parupeneus* (Bleeker, 1863) includes 31 valid species (Fricke et al., 2018). Some of these species, such as *Parupeneus rubescens*, was observed in Syrian marine waters and recorded for the first time by (Sabour and Masri, 2022).

General taxonomic criteria for classifying individuals of this genus include a pair of sensitive barbels extending from the lower chin to the beginning of the operculum, which function to detect food hidden in the sand, additionally, they were characterized by a dark brown line that runs from the front of the snout to the eye and extends to the tail (Randall and Kulbicki, 2006). Goatfishes can change their coloration to adapt to their surrounding environment, Rajan et al., (2011), as well as

a black spot located in the middle of the caudal fin (Vishnupriya and Nair, 2023). Goatfishes typically caught using trawls (Vivekanandan et al., 2003). The coloration of *Parupeneus spilurus* appears light gray, with a black stripe extending from the front of the snout to the opposite side of the anal fin, with a total length of 9.7 cm. The barbels are white and reach the anterior edge of the Operculum; Fig, (1).

Fig 1– *Parupeneus spilurus* specimen obtained from the stomach of *Fistularia commersonii* (26/11/2023), the coast of Latakia Province, Syria. total length (TL): 9.7 cm; total weight (TW): 8.70 g.
A: Barbels; **B:** Dark line on the front; **C:** Dark line on the side; **D:** Black spot.

2. METHODOLOGY

A total of 67 individuals of *F. commersonii* were collected from the Syrian marine waters between November 27, 2022, and January 25, 2024. During this study, *P. spilurus* was found in only one stomach of *F. commersonii* specimen caught on November 26, 2023; Fig, (2) shows a lateral view of *Parupeneus spilurus*. The sample was preserved in 10% formaldehyde solution in a glass container, labeled with the scientific name, collection location, and date, at the Postgraduate Laboratory, Department of Zoology, Faculty of Science, Tishreen University. We took the measurements following the methods according to (Koeda and Ching-Ho, 2018).

3. RESULTS AND DISCUSSION

The identification of *P. spilurus* was confirmed using taxonomic keys by (Bellwood et al., 1991). Morphometric measurements were presented in Table 1. The body of *P. spilurus* is elongated and features two dorsal fins: the first dorsal fin has eight spines, with the third spine being the longest, while the second dorsal fin consists of nine rays. The mouth is small and the lips are relatively thin and not particularly fleshy as shown in Fig, (3). The bony structure which forms the roof of the mouth, separates the mouth cavity from the nasal cavity; Fig, (4). The upper side of the head exhibits a slight inward curve. The species has seven gill rakers on the upper line and twenty-three on the lower line, totaling thirty gill rakers (7 + 23 = 30). The pectoral fins contain fourteen rays, the ventral fins have fourteen rays, and the anal fin consists of 1 spine and seven rays. The distance from the tail to the second dorsal fin is approximately nine scales, while the distance between the two dorsal fins measures about 1.2 cm. The body coloration is a light gray, complemented by a prominent black stripe that extends from the tip of the snout, through the eye, and to the anterior portion of the tail. In addition to this stripe, a distinct black spot is located on the lateral side of the caudal peduncle. The barbels are white and situated beneath the chin, and the operculum features one spine; Fig, (5).

Fig 2- A lateral view of *Parupeneus spilurus* specimen obtained from the stomach of *Fistularia commersonii* (26/11/2023), the coast of Latakia Province, Syria. total length (TL): 9.7 cm; total weight (TW): 8.70 g.

Fig 3- the roof of the mouth of *Parupeneus spilurus*.

Fig 4- The shape of the mouth of *Parupeneus spilurus*.

Fig 5- The operculum of *Parupeneus spilurus* with one spine.

Table 1 Morphometric measurements of *Parupeneus spilurus* captured in the Syrian marine waters; Author field work, 2023.

Standard length (SL) (mm)	**72.5**	**Measurements % of SL**	
Counts		Body depth	23.4
Dorsal-fin rays	VIII, 9	Body width	12
Anal-fin rays	I, 7	Head length (HL)	35.1
Pectoral-fin rays	14	Caudal peduncle depth	8.3
Pelvic-fin rays	14	Caudal peduncle length	11.4
Principal caudal-fin rays	i+18+1	Pre-dorsal-fin length	40.8
Lateral-line scales	25	Pre-anal-fin length	62.3
Scales above lateral line to the origin of the first dorsal fin	3	Pre-pelvic-fin Length	37.6
The scale below lateral line to the origin of the anal fin	5	-	-
Circumpeduncular scales	10	-	-
Middle pre-dorsal-fin scales	13	-	-
Median pre-pelvic-fin scales	8	-	-
Gill rakers	7+23=30	-	-
Measurements % of HL			
Snout length	41.4	First dorsal-fin soft ray length	1.2
Orbit diameter	22.1		
Interorbital width	20.3	Second dorsal-fin soft ray length	0.82
Upper jaw length	4.4	seventh dorsal-fin soft ray length	0.86
Barbel length	4.5	Eighth dorsal-fin soft ray length	0.86
First dorsal-fin spine length	1.2	Sixth anal-fin soft ray length	0.1
Second dorsal-fin spine length	2.8	Caudal fin length	8.2
Third dorsal-fin spine length	3.6	Caudal fin concavity	0.6
Fourth dorsal-fin spine length	3.1	Pectoral fin length	5.5
First dorsal-fin soft ray length	1.2	Pelvic fin length	5.9
% of eight dorsal-fin soft ray length		100	

4. CONCLUSION

The occurrence of non-native fish species in the stomach of *F. commersonii* caused by the introduction of ballast water, which is a common way for non-native species to spread. When ships release ballast water from faraway places, they introduce new species into different environments. The results of this research indicate the presence of *P. spilurus* in the stomach of *F. commersonii*, recorded for the first time in the marine waters of Latakia Governorate. The emergence of this new fish species in our region serves as a significant indicator of changes in biodiversity within the Eastern Mediterranean Sea, particularly in Syria.

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Author Contributions

All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by Nour Ghassan Baddour, Mohamad Younis Galiya, Waad George Sabour and Taghrid Masoud Layka Which the first draft of the manuscript was written by Nour Ghassan Baddour and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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Conflict of Interest

The authors declare that there are no conflicts of interests.

Informed consent

Not applicable.

Ethical approval & declaration

In this article, the animal regulations are followed as per the ethical committee guidelines of Department of Zoology, Faculty of Science, Tishreen University, Lattakia, Syria; the authors recorded the Goatfish Species *Parupeneus spilurus* (Perciformes: Mullidae) in the Marine Waters of Syria, Eastern Mediterranean Sea. The Animal ethical guidelines are followed in the study for species observation, identification & experimentation.

Data and materials availability

All data associated with this study are present in the paper.

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