

**ORTHOPRISTIS CHRYSOPTERA (ACTINOPTERYGII: PERCIFORMES: HAEMULIDAE):
A NEW ALIEN FISH FOR THE MEDITERRANEAN SEA**

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Abstract. An individual of Pigfish, *Orthopristis chrysoptera* (Linnaeus, 1766), is recorded for the first time for the Mediterranean Sea, raising to six the number of species of the family Haemulidae in the basin. The fish was caught on 12 September 2020 in the harbor of Siracusa (Ionian Sea) by an angler and had an estimated total length of about 16 cm. Possible pathways of introduction and the importance of citizen science for the early detection of alien fish are discussed.

Keywords: Ionian Sea, grunts, citizen science, non-indigenous fish, early detection

INTRODUCTION

Fishes of the family Haemulidae Gill, 1885, with a total of 133 valid species (Fricke et al. 2020), are widely distributed in the Atlantic and Mediterranean Sea, Indian and Pacific oceans. The majority of the species are marine, some are found in brackish waters, and only a few species occur in freshwaters (Nelson et al. 2016). A total of five species of the family have been recorded from the Mediterranean Sea, of which one belongs to the genus *Parapristipoma* Bleeker, 1873, namely *Parapristipoma octolineatum* (Valenciennes, 1833), and two to the genera *Plectorhinchus* Lacepède, 1801 and *Pomadasys* Lacepède, 1802, namely *Plectorhinchus gaterinus* (Forsskål, 1775), *Plectorhinchus mediterraneus* (Guichenot, 1850), *Pomadasys incisus* (Bowdich, 1825), and *Pomadasys stridens* (Forsskål, 1775) (see Fricke et al. 2020). However, only *Pomadasys incisus*, a species of eastern Atlantic origin, and *Pomadasys stridens*, a Lessepsian immigrant distributed in the western Indian Ocean, are relatively common in some areas of the western and eastern Mediterranean Sea, respectively. *Pomadasys incisus* can be observed in relatively large numbers in the western part of the basin, as for example in the Tyrrhenian Sea (Tiralongo et al. 2019). On the contrary, in Italian waters, *Pomadasys stridens* is known on the basis of a single record from the Ligurian Sea (Servello et al. 2019).

Orthopristis chrysoptera (Linnaeus, 1766), commonly known as “Pigfish”, is a fish of the family Haemulidae whose natural distribution is confined to the western Atlantic Ocean, in the Gulf of Mexico, from Florida to the Yucatan peninsula, and in the United States, from New York to the northern Bahamas and Bermuda (Ohs et al. 2011). The maximum reported standard length (SL) is 46 cm, while the common total length (TL) is about 30 cm (Froese and Pauly 2019). It is a coastal species that occurs over sandy and muddy bottoms and mainly feeds on benthic invertebrates, such as polychaetes and shrimps (Howe 2001). This species is cultured for use as a live bite for anglers and can be easily kept in aquaria (Cassiano et al. 2009, Ohs et al. 2011), although it is not usually used as an ornamental fish.

In this work, we report for the first time on the presence of *Orthopristis chrysoptera* in the Mediterranean Sea. The possible pathways of introduction of this new alien fish and the importance of citizen science for the early detection of alien species are discussed. Our record is based on the capture of a single individual, whose photo has reached us through the citizen science project “AlienFish” (Tiralongo et al. 2019, 2020). In recent years, the opportunistic observations provided by “citizen scientists”, such as amateurs and professional fishers, have become a new, important, and low-cost source for the early detection of alien and rare species (Giovos et al. 2019, Tiralongo et al. 2019, Azzurro and Tiralongo 2020, Tiralongo et al. 2020).

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MATERIALS AND METHODS

On 12 September 2020, a photo of an unidentified fish caught inside the harbor of Siracusa (Italy, south-eastern Sicily, Ionian Sea, coordinates: 37.06789N, 15.29346E) (Fig. 1) was received by the authors. Unfortunately, because of its small size, the fish was released alive in the same place of capture. The fish was caught with a fishing rod, using shrimp as bait, by an angler targeting *Sparus aurata* Linnaeus, 1758, at a depth of about 8 m. The photo (Fig. 2) was sent us through WhatsApp from a participant of

the “AlienFish” project, a project which involves “citizen scientists” represented by sea users, such as fishermen and divers, and launched in March 2012 by *Ente Fauna Marina Mediterranea*. The project has contributed to the reporting and early detection of several rare and non-indigenous fishes (but also invertebrates) in Italian waters (Tiralongo et al. 2019 and references therein, Tiralongo et al. 2020), and is supported by a dedicated Facebook page* and the website**. The species was identified following the description of Darcy (1983) and Kells and Carpenter (2011).



Fig. 1. The red circle indicates the location (Siracusa, Ionian Sea) of the central Mediterranean Sea where the specimen of *Orthopristis chrysoptera* was caught on 12 September 2020



Fig. 2. The specimen of *Orthopristis chrysoptera* caught on 12 September 2020 at Siracusa (central Mediterranean Sea, Ionian Sea); the estimated total length was about 16 cm

* <https://www.facebook.com/alienfish>

** <https://www.entefaunamarinamediterranea.it/alienfish-project>

RESULTS

The total length (TL) of the fish was estimated by comparing it with the hand of the fishermen and was of about 16 cm. The body was laterally compressed, with the head profile pointed and the eyes close to the dorsal profile. The caudal fin was moderately forked. A single elongated dorsal fin extended almost until the beginning of the caudal peduncle. Anal fin short, in the posterior part of the body. Pectoral and pelvic fins moderately long. The dorsal area was greyish, while the remaining part of the background color was whitish and gradually lightened going towards the ventral part. All the body was crossed by short and irregular narrow bright yellow stripes: parallel to the long axis of the body in the ventral part, while in the dorsal part they were oblique. A total of six irregular vertical dark bars extended from behind the head to the end of the caudal peduncle, along the dorsal and mid-lateral area; the first four bars were larger and discontinuous. All the visible parts of all fins were light grey, with small brownish spots on the dorsal and caudal fin.

DISCUSSION

On the basis of the taxonomic descriptions (Darcy 1983, Kells and Carpenter 2011), the general morphology and the specific traits of the color pattern are sufficient to assign the species to *Orthopristis chrysoptera* and to clearly differentiate it from all other grunt species (Haemulidae).

Considering the size of the fish, according to the length data in Howe (2001), it must be considered a juvenile specimen. All the morphological and color pattern characters analyzed matched with the description of *O. chrysoptera* and allowed us to easily distinguish the specimen caught from all the other fish of the family Haemulidae recorded in the Mediterranean Sea (Darcy 1983, Kells and Carpenter 2011), namely *Parapristipoma octolineatum* (body almost uniformly dark, with four narrow longitudinal white bars extending along the whole body length), *Plectorhinchus gaterinus* (in adults the silvery-whitish body is irregularly scattered with black spots, while in juveniles several dark longitudinal bars are present on body), *Plectorhinchus mediterraneus* (in adults the body is almost uniformly grayish with violet shades, while in juveniles there are two longitudinal dark bars), *Pomadasys incisus* (body greyish dorsally and silvery-white midlaterally and on belly; a dark spot on the upper part of the operculum; orange or yellow fins) and *Pomadasys stridens* (body greyish dorsally and silvery-white midlaterally and on belly, longitudinally crossed by three yellowish or light brown bars, with the lower one extending from the eye to the caudal peduncle). Furthermore, we can distinguish *Orthopristis chrysoptera* from the three similar Atlantic species of the genus *Haemulon* Cuvier, 1829, namely *Haemulon carbonarium* Poey, 1860, *Haemulon flavolineatum* (Desmarest, 1823), and *Haemulon plumierii* (Lacepède, 1801), that present continuous yellow stripes on the body.

Considering that the natural distribution of *Orthopristis chrysoptera* is limited to some areas of the

western Atlantic Ocean (Ohs et al. 2011), we can exclude its introduction through the Strait of Gibraltar. On the contrary, a ship mediated introduction remains highly possible since this individual has been captured within a large commercial harbor. Indeed, for several exotics fishes, the translocation in Mediterranean waters has been assigned to ship transport (e.g., ballast waters, sea-chests, transport, of drilling platforms) (Azzurro et al. 2019). Furthermore, the long-distance transport through ballast waters was demonstrated by Wonham et al. (2000) for a total of 32 fishes. The same mechanism of transport was also demonstrated by Coutts and Dodgshun (2007) for sea-chests. Considering the introduction through an aquarium, although we can't totally rule out this possibility, this introduction way seems less likely; indeed, although *Orthopristis chrysoptera* can be easily kept in an aquarium, it doesn't seem to be normally used as ornamental fish (Cassiano et al. 2009).

In this paper, we document for the first time the occurrence of a new grunt (Haemulidae) in the Mediterranean Sea, bringing to six the number of species of this family recorded in the basin. This record also highlights the importance of citizen science for the early detection of alien species (but also other newcomers such as those entering through the Strait of Gibraltar) in Mediterranean marine waters (Giovos et al. 2019, Tiralongo et al. 2019, 2020). Indeed, the early detection of potentially invasive species is of particular importance for those species that can cause serious ecological impacts on the Mediterranean ecosystem. Furthermore, there is the need of improving the exchange of information between researches and "citizen scientists", in order to avoid that the alien species being released alive after capture, rather than retain them and hand them over to researchers for further analysis, as it has also recently happened in the harbor of Gioia Tauro (Tyrrhenian Sea) for *Siganus fuscescens* (Houttuyn, 1782) (see Azzurro and Tiralongo 2020). Furthermore, local ecological knowledge can also play a crucial role in monitoring and assessing the abundance and distribution of alien species (Clusa et al. 2018).

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