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NEW RECORD OF *EPINEPHELUS AREOLATUS* IN THE MEDITERRANEAN SEA: FIRST RECORD FROM SYRIA

Sara AL MABRUK

Department of General Nursing Technology, Higher Institute of Science and Technology, Cyrene, Libya
Marine Biology in Libya Society, El Bayda, Libya
e-mail: sara.almabruk@omu.edu.ly

Ioannis GIOVOS

Sea, Environmental Organization for the Preservation of the Aquatic Ecosystems, Thessaloniki, Greece
e-mail: ioannis.giovos@isea.com.gr

Francesco TIRALONGO

Department of Biological, Geological and Environmental Sciences, University of Catania, Italy
Ente Fauna Marina Mediterranea, Avola, Italy
e-mail: francesco.tiralongo@unict.it

ABSTRACT

One specimen of the Areolate Grouper Epinephelus areolatus (Forsskål, 1775) was caught on 29th May 2019 off the coast of Latakia. This represents the first record of the species for the Syrian waters and the fourth for the Mediterranean Sea. We finally discuss its introduction pathway in the Mediterranean.

Key words: Serranidae, eastern Mediterranean, non-indigenous fish, citizen science

NUOVA SEGNALEZIONE DI *EPINEPHELUS AREOLATUS* NEL MAR MEDITERRANEO: PRIMA SEGNALEZIONE DALLA SIRIA

SINTESI

Un esemplare di Epinephelus areolatus (Forsskål, 1775) è stato catturato il 29 maggio 2019 al largo della costa di Latakia. Questa cattura rappresenta la prima segnalazione della specie da acque siriane e la quarta segnalazione per il mare Mediterraneo. Si discute la via di introduzione di questa specie in Mediterraneo.

Parole chiave: Serranidae, Mediterraneo orientale, pesci non indigeni, scienza del cittadino

INTRODUCTION

The Mediterranean Sea hosts six non-indigenous *Epinephelus* Bloch, 1793 species, namely *Epinephelus areolatus* (Forsskål, 1775), *Epinephelus coioides* (Hamilton, 1822), *Epinephelus fasciatus* (Forsskål, 1775), *Epinephelus geoffroyi* (Klunzinger, 1870), *Epinephelus malabaricus* (Bloch & Schneider, 1801) and *Epinephelus merra* Bloch, 1793 (Golani *et al.*, 2002, 2015).

Among them, *E. areolatus*, commonly known as the Areolate Grouper, is a species of Indo-Pacific origin, whose distribution extends from the Red Sea and eastern coast of Africa to southern Japan and New Caledonia (Froese & Pauly, 2021). In its native range, *E. areolatus* is common in coastal waters, on seagrass beds and on soft bottoms close to hard substrates, such as rocky reefs or dead corals, where it feeds on fish and benthic invertebrates (Heemstra & Randall 1993; Randall *et al.*, 1998). This species was first recorded from the Mediterranean Sea based on a specimen caught

along the Israeli coast in 2015 (Rothman *et al.*, 2016). More recently, two further specimens were collected in Lebanon in 2019 (Bariche & Edde, 2020).

We hereby report for the first time the presence of *E. areolatus* in Syrian waters, discussing the introduction pathway of this recently introduced non-indigenous fish in the Mediterranean Sea.

MATERIAL AND METHODS

On 11th May 2020, a Syrian professional fisherman posted a photo of a fish unknown to him on the Facebook® group “دي ص ندم” (fishing addict), asking for an identification. The particular color pattern of the grouper, represented by a reticulated pattern of yellow-brownish spots scattered over body (Heemstra & Randall, 1993; Craig *et al.*, 2012), easily allowed the authors of the present note to identify it as *E. areolatus*. Soon after, we contacted the fisherman asking for further data about the catch. In particular, the fish was caught on 29th May 2019

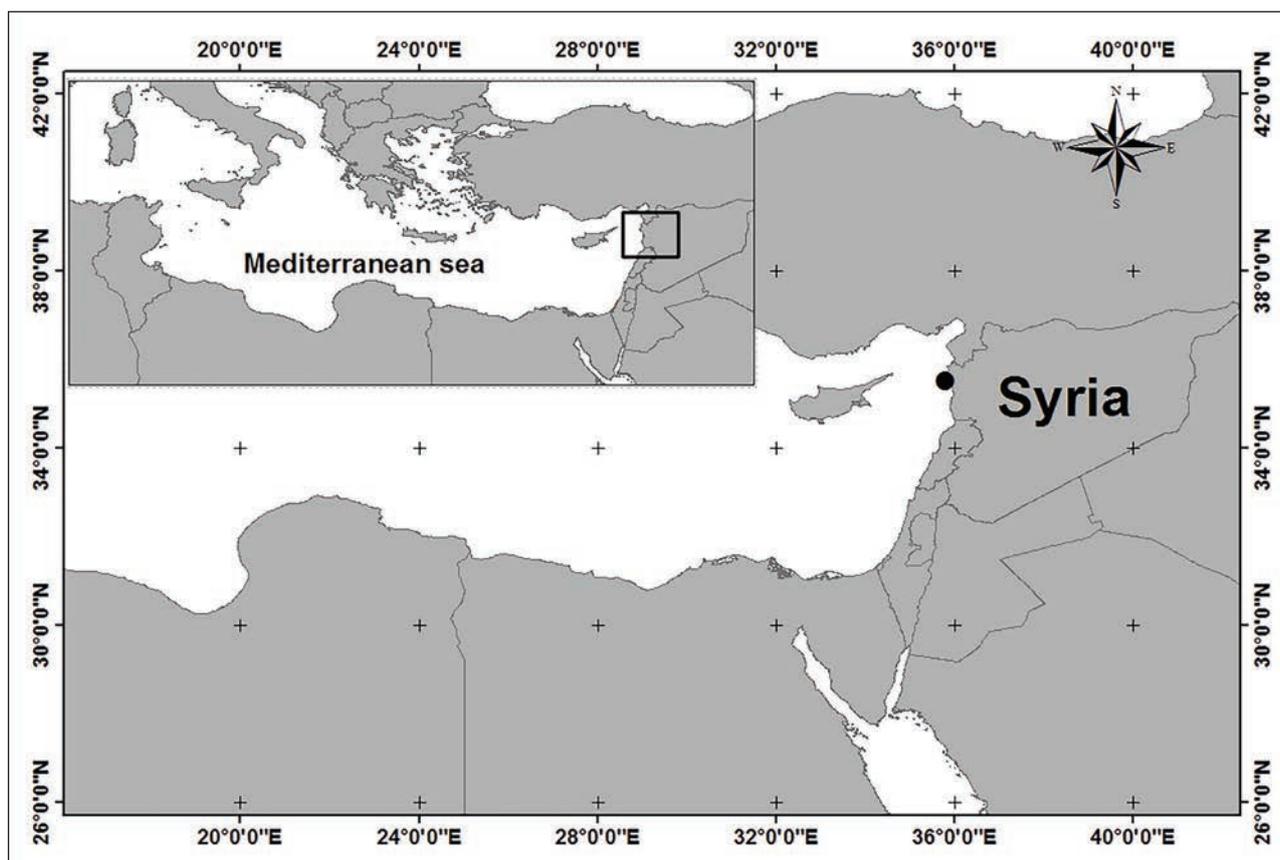


Fig. 1: Location in which the specimen of *Epinephelus areolatus* was caught on 29 May 2019, at Lattakia, Syria, eastern Mediterranean Sea.

Sl. 1: Zemljevid obravnavanega območja z označeno lokaliteto, kjer je bil 29. maja 2019 pri Latakiji (Sirija, vzhodno Sredozemsko morje) ujet primerek rdečepikaste kirnje.



Fig. 2: *Epinephelus areolatus*, specimen caught on 29 May 2019 with a trolling line operating at a depth of 61 m at Lattakia, Syria (photo by Nizar Aziz).

Sl. 2: Primerek rdečepikaste kirnje (*Epinephelus areolatus*), ujet na parangal 29. maja 2019 na globini 61 m pri Latakiji (Sirija, vzhodno Sredozemsko morje) (foto: Nizar Aziz).

with a trolling line operating at a depth of 61 m, off the coast of Latakia, northern Syria (35°32'27.6"N 35°45'04.2"E) (Fig. 1). Unfortunately, the specimen (Fig. 2) was consumed by the fisherman and therefore it was not possible to carry out further analysis. However, measurements of the fish's size were carried out analyzing the photo provided by the fisherman using the ImageJ software (Schneider *et al.*, 2012): the length of the fish was estimated using as standard the size of the thumbnail of the fisherman (Scannella *et al.*, 2020). Moreover, using the coefficients of the total length-weight relationship, it was possible to estimate the weight of the fish (Froese & Pauly, 2021).

RESULTS AND DISCUSSION

The fish had an estimated total length (TL) of 37 cm, a standard length (SL) of 30.5 cm, and a weight of 702 g. It represents the fourth specimen of *E. areolatus* reported from the Mediterranean Sea and the first known from Syria. *Epinephelus areolatus* was commonly reported as a Lessepsian immigrant (Rothman *et al.*, 2016; Bariche & Edde, 2020). Indeed, considering that past records occurred near the Suez Canal, and the fact that the species naturally occurs in the Red Sea, the introduction through this pathway is the most probable explanation for its presence in the basin. Concerning our record from Syrian waters, we also suggest the Suez Canal as introduction pathway for the Mediterranean Sea, or a secondary introduction from an established Mediterranean population

(Coll *et al.*, 2010).

This Lessepsian immigrant appears to spread quite rapidly through the Mediterranean Sea, and although to date only four specimens were recorded, we can't rule out the presence of an established population in the eastern part of the basin. Further studies are therefore necessary to better understand the expansion dynamics of this species, whose abundance is still probably low. In this regard, social media and citizen science play an important role in the monitoring and early detection of non-indigenous species (Azzurro *et al.*, 2013; Bariche & Azzurro, 2016; Giovos *et al.*, 2019; Tiralongo *et al.*, 2019, 2020; Azzurro & Tiralongo, 2020; Al Mabruk *et al.*, 2021).

In conclusion, the increasing number of alien fish, and in general of alien species, in the Mediterranean Sea, and in particular in its eastern part, highlights a dramatic ecosystem change due to alteration of its biodiversity. The Mediterranean Sea is the most globally impacted ecoregion by bioinvasions (Katsanevakis *et al.*, 2014). To date, more than 100 alien fish species have been recorded in the Mediterranean Sea (Galil & Goren, 2014), and their introduction rate seems to increase continuously, primarily due to the opening of the Suez Canal (Katsanevakis *et al.*, 2014). Monitoring programs, with the help of citizen scientists, appear to be an excellent low-cost support in order to study the biological invasions dynamics in the basin and to upgrade the checklist in neglected country such as Syria (Ali, 2018; Al Mabruk *et al.*, 2021).

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NOVI ZAPIS O POJAVLJANJU RDEČEPIKASTE KIRNJE (*EPINEPHELUS AREOLATUS*) V SREDOZEMSKEM MORJU: PRVI PODATKI ZA SIRIJO

Sara AL MABRUK

Department of General Nursing Technology, Higher Institute of Science and Technology, Cyrene, Libya
Marine Biology in Libya Society, El Bayda, Libya
e-mail: sara.almabruk@omu.edu.ly

Ioannis GIOVOS

Sea, Environmental Organization for the Preservation of the Aquatic Ecosystems, Thessaloniki, Greece
e-mail: ioannis.giivos@isea.com.gr

Francesco TIRALONGO

Department of Biological, Geological and Environmental Sciences, University of Catania, Italy
Ente Fauna Marina Mediterranea, Avola, Italy
e-mail: francesco.tiralongo@unict.it

POVZETEK

Primerek rdečepikaste kirnje (Epinephelus areolatus (Forsskål, 1775)) je bil ujet 29. maja 2019 ob obali Latakije. Gre za prvi zapis o pojavljanju te vrste za sirske vode in četrti za Sredozemsko morje. Avtorji razpravljajo o načinu prihoda vrste v Sredozemsko morje.

Ključne besede: Serranidae, vzhodno Sredozemsko morje, tujerodne ribe, ljubiteljska znanost

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