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VSEBINA / *INDICE GENERALE* / *CONTENTS*BIOTSKA GLOBALIZACIJA
GLOBALIZZAZIONE BIOTICA
*BIOTIC GLOBALIZATION***Malek ALI, Aola FANDI & Christian CAPAPÉ**

The First Mediterranean Record of Red-Toothed Triggerfish *Odonus niger* (Balistidae) from the Syrian Coast (Eastern Mediterranean Sea) 173
Prvi zapis o pojavljanju rdečezobe balestre Odonus niger (Balistidae) iz sirske obale (vzhodno Sredozemsko morje)

Zafer TOSUNOĞLU & Okan AKYOL

Occurrence of *Pterois miles* (Scorpaenidae) in the Mediterranean Sea 179
Pojavljanje navadne plamenke Pterois miles (Scorpaenidae) v Sredozemskem morju

Izdihar Ali AMMAR New Non-Native and Rare

Marine Invertebrates in Syrian Waters 187
Novi primeri o pojavljanju tujerodnih in redkih morskih nevretenčarjev v sirskih vodah

Luca CASTRIOTA, Manuela FALAUTANO & Laura SINAPI

A New Locality Record for the Range Expanding Fish *Seriola fasciata* in the Mediterranean 199
Nova lokaliteta pojavljanja vrste Seriola fasciata, ki širi areal v Sredozemskem morju

F. Saadet KARAKULAK, Mehmet GÖKOĞLU, Uğur UZER & Hakan KABASAKAL

First Record of the *Abudefduf* cf. *saxatilis/vaigiensis/troschellii* Species Complex (Pisces: Pomacentridae) in the Black Sea 205
Prvi zapis o pojavljanju primerka vrste iz kompleksa Abudefduf cf. saxatilis/vaigiensis/troschellii (Pisces: Pomacentridae) iz Črnega morja

SREDOZEMSKA HRUSTANČNICE
SQUALI E RAZZE MEDITERRANEE
*MEDITERRANEAN SHARKS AND RAYS***Farid HEMIDA, Christian REYNAUD & Christian CAPAPÉ**

Occurrence of the Rare Blonde Ray, *Raja brachyura* (Rajidae), Off the Algerian Coast (Southwestern Mediterranean Sea) 213
Pojavljanje redke okraste raže, Raja brachyura (Rajidae), ob alžirski obali (jugozahodno Sredozemsko morje)

Hakan KABASAKAL, Uğur UZER & F. Saadet KARAKULAK

Occurrence of Longnosed Skate, *Dipturus oxyrinchus*, in the Sea of Marmara 221
Pojavljanje koničaste raže, Dipturus oxyrinchus, v Marmarskem morju

Cem ÇEVİK, Gökhan GÖKÇE & Deniz ERGUDEN

Capture of a Juvenile Sharpnose Sevengill Shark, *Heptranchias perlo* (Bonnaterre, 1788), from the Turkish Coast (Eastern Mediterranean Sea) with Updated Records from Mediterranean Waters 229
Ulov mladostnega primerka morskega psa sedmeroškrjarja, Heptranchias perlo (Bonnaterre, 1788), iz turških voda (vzhodno Sredozemsko morje) z posodobljenim seznamom zapisov o pojavljanju v Sredozemskem morju

Eloïse DEYSSON, Sarah FOXONET, Etienne RÉGNIER, Chloé MOSNIER, Florane TONDU, Janis BROUTIN-RENAUD Bruno COGNIE, Alessandro DE MADDALENA, Hakan KABASAKAL & Nicolas ZIANI

Additional Historical Records of Great White Sharks, *Carcharodon carcharias*, Caught in the Gulf of Lion, Northwestern Mediterranean Sea, Between the 1920s and 1950s 239
Dodatni zgodovinski zapisi o belih morskih volkih, Carcharodon carcharias, ujetih v zalivu Lyon (severozahodno Sredozemsko morje) v dvajsetih in petdesetih letih

Malek ALI, Aola FANDI, Dima GHANEM & Christian CAPAPÉ

Capture of a Juvenile Basking Shark, *Cetorhinus maximus* (Cetorhinidae), Off the Syrian Coast, With Comments on the Occurrence of the Species in the Levant Basin (Eastern Mediterranean Sea) 251
Ulov mladostnega primerka morskega psa orjaka, Cetorhinus maximus (Cetorhinidae), ob sirski obali s komentarji o pojavljanju vrste v levantskem bazenu (vzhodno Sredozemsko morje)

Hakan KABASAKAL, Uğur UZER & F. Saadet KARAKULAK

Impact of Fishing Capacity and Environmental Parameters on Landings of *Hexanchus griseus* in the Sea of Marmara 257
Vpliv ribolovne zmogljivosti in okoljskih parametrov na ulov vrste Hexanchus griseus v Marmarskem morju

MORSKA FAVNA
 FAUNA FAUNA
 MARINE FAUNA

Tea KNAPIČ, Irena FRKOVIČ, Borut MAVRIČ & Lovrenc LIPEJ

An Insight into the Heterobranch Fauna of Fiesa (Slovenia, Northern Adriatic Sea) 275
Vpogled v favno polžev zaškrjarjev Fiese (Slovenija, severni Jadran)

Francesco TIRALONGO, Alessandro NOTA, Emanuele MANCINI & Luigi MUSCO

Wounds Inflicted on Humans by the White Seabream (*Diplodus sargus*): First Scientific Report of Aggressive Behavior 291
Rane, ki jih ljudem zadajajo šargi (Diplodus sargus): prvo znanstveno poročilo o agresivnem vedenju

ORNITOFAVNA
 ORNITOFAUNA
 ORNITHOFAUNA

ANDREA DE ANGELIS & MARIO PELLEGRINI

Nuovo Sito di Nidificazione di Aquila Reale *Aquila chrysaetos* nel Subappennino Abruzzese 301
Novo gnezdišče planinskega orla v subapeninskih Abrucih

FLORA
 FLORA
 FLORA

Amelio PEZZETTA & MARCO PAOLUCCI

La flora di Taranta Peligna (Abruzzo, Italia) 317
Flora Taranta Peligna (Abruci, Italia)

Kazalo k slikam na ovitku 357
Index to images on the cover 357

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FIRST RECORD OF THE *ABUDEFDUF* CF. *SAXATILIS*/*VAIGIENSIS*/*TROSCHELII* SPECIES COMPLEX (PISCES: POMACENTRIDAE) IN THE BLACK SEA

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ABSTRACT

*On 28 September 2024, an individual of the pomacentrid genus *Abudefduf* Forsskål, 1775, was recorded on video in the southwestern Black Sea, off the coast of Turkey. This is the first record of the *A. cf. saxatilis/vaigiensis/troschelii* species complex in the Black Sea. The paper provides information on the colouration and some morphological characteristics of the individual. However, to accurately determine which species from this complex is present in the Black Sea, the specimen should have been collected for detailed morphometric and genetic analyses.*

Key words: *Abudefduf*, Pomacentridae, Black Sea, invasion

PRIMA TESTIMONIANZA DI *ABUDEFDUF* CF. *SAXATILIS*/*VAIGIENSIS*/*TROSCHELII* COMPLESSO DI SPECIE (PISCES: POMACENTRIDAE) NEL MAR NERO

SINTESI

*Il 28 settembre 2024, un individuo del genere *Abudefduf* Forsskål, 1775 (Pomacentridae), è stato avvistato in un video girato nel Mar Nero sudoccidentale, al largo delle coste della Turchia. Si tratta della prima registrazione del complesso di specie *A. cf. saxatilis/vaigiensis/troschelii* nel Mar Nero. Il documento fornisce informazioni sulla colorazione e su alcune caratteristiche morfologiche dell'individuo. Tuttavia, per determinare con precisione quale specie di questo complesso sia presente nel Mar Nero, sarebbe stato necessario catturare l'esemplare per condurre analisi morfometriche e genetiche dettagliate.*

Parole chiave: *Abudefduf*, Pomacentridae, Mar Nero, invasione

INTRODUCTION

The pomacentrid damselfishes (Perciformes: Labroidae: Pomacentridae) are represented by 30 genera and 424 species distributed worldwide, with one of the best-known genera in the family being *Abudefduf* (Froese & Pauly, 2024). Pomacentrids are small fishes, typically reaching less than 15 cm in total length (TL), with a maximum TL of 35 cm. The mouth is small in most species with moderately to highly protrusible jaws, and a single pair of nostrils is found in Atlantic species (Edwards, 2016). According to Kovačić *et al.* (2021) four species of *Abudefduf* have been reported from Mediterranean waters over the last few decades. The chronological order of the publications that reported the first records of *Abudefduf* spp. from the Mediterranean Sea, lists these species as follows: *A. vaigiensis* (Quoy & Gaimard, 1825) (Tardent, 1959), *A. saxatilis* (Linnaeus, 1758) (Azzurro *et al.*, 2013; Deidun & Castriota, 2014), *A. hoefleri* (Steindachner, 1881) (Vella *et al.*, 2016) and *A. sexfasciatus* (Lacepède, 1801) (Giovos *et al.*, 2018). Of these, only *A. saxatilis* has been reported from Turkish waters (Bilecenoğlu, 2016); however, the most recent ichthyological checklist of Turkish seas by Bilecenoğlu (2024) includes the *A. cf. saxatilis/vaigiensis/troschelii* species complex rather than solely mentioning the occurrence of *A. saxatilis* in the region. Fishes of the genus *Abudefduf* are increasingly being recorded in Mediterranean waters and, as emphasised by Dragičević *et al.* (2021), most of these occurrences are based merely on underwater photographs or video footage. This article reports the first record of an individual of the *A. cf. saxatilis/vaigiensis/troschelii* species complex from the Black Sea based on underwater footages recorded by a recreational spearfisherman.

MATERIAL AND METHODS

The present specimen of the *A. cf. saxatilis/vaigiensis/troschelii* species complex was recorded in the southwestern part of the Black Sea, which is defined as geographical subarea (GSA) 29 of the Mediterranean (GFCM, 2018; Fig. 1). As it is visible from the photo (Fig. 2), the rocky substratum is covered by dense vegetation of brown and green algae, *Cystoseira* spp. and *Ulva* spp., both well-known components of the Black Sea marine flora. Given the nature of the sampling (opportunistic photographic record), this study is a typical example of opportunistic examination of marine fauna, rather than a direct result of a scientific field survey (Hiddink *et al.*, 2023). Species identification follows Edwards (2016) and Dragičević *et al.* (2021), taxonomic nomenclature is based on Froese and Pauly (2024). The examined video footage and the captured frame of the specimen of the *A. cf. saxatilis/vaigiensis/troschelii* species complex are available from the first author upon request for further inspection.

RESULTS AND DISCUSSION

On 28 September 2024, a specimen of what seems to be a sergeant major damsel fish (Fig. 2) was captured on video by a recreational spearfisherman off the coast of Eşek Island, Riva (41°13'56.10" N; 29°13'4.36" E; southwestern Black Sea) over a rocky bottom, at a depth ranging between 5 and 7 m. Upon inspection of the footage the following characters were observed: body deep and laterally compressed; five prominent black

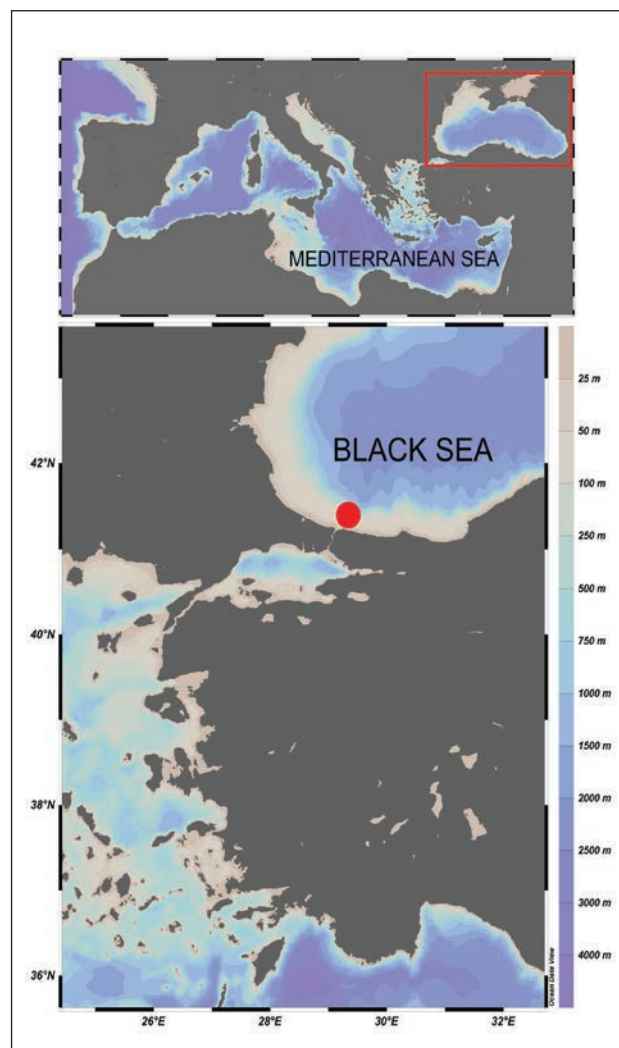


Fig. 1: Red rectangle on the map (upper panel) depicts the Black Sea in the Mediterranean Basin. The solid red circle (lower panel) indicates the locality where the present specimen of *A. cf. saxatilis/vaigiensis/troschelii* was filmed as estimated by the recreational spearfisherman.

Sl. 1: Rdeči pravokotnik na zemljevidu (zgornja plošča) prikazuje Črno morje v Sredozemskem bazenu. Rdeč krogec (spodnja plošča) označuje lokacijo, kjer je bil posnet primerek vrste iz kompleksa *A. cf. saxatilis/vaigiensis/troschelii* po oceni rekreativnega podvodnega ribiča.

bars on the sides, narrowing towards belly, a faint sixth bar on upper caudal peduncle; colour of abdomen silvery white, with a black spot at the base of pectoral fins, the fifth black bar continuing on the dorsal fin, two black dots at the base of caudal fin (characteristic of this species), back yellowish green. The descriptive characters were consistent with those described for *A. cf. saxatilis/vaigiensis/troschelii* by Azzurro *et al.* (2013), Deidun and Castriota (2014), Tsadok *et al.* (2014), Vella *et al.* (2016) and Edwards (2016).

In recent years, many fish species of tropical origin have been reported from different regions of the Mediterranean Sea. The majority were Lessepsian immigrants (Golani *et al.*, 2021), entering the Mediterranean Sea through the Suez Canal. However, species migrations to the Mediterranean are not limited to the Suez Canal; several Atlantic species also enter through the Strait of Gibraltar (Azzurro *et al.*, 2022). One of these is *A. saxatilis* (Dragičević *et al.*, 2021). According to Froese and Pauly (2024), *A. saxatilis* is a strictly Atlantic species,

with its distribution range extending in the tropical and subtropical Atlantic from 43°N to 35°S latitudes (Edwards, 2016). Although the introduction vectors for a given occurrence are difficult to establish and may vary depending on the species, as emphasised by Bitar (2021) and Kampouris and Sujariya (2023), the most likely are canal connections (in Lessepsian migration), ballast water from ships, and aquarium releases. In recent years, several Mediterranean (thermophilic) and/or Red Sea (tropical) fish species have been reported in the Sea of Marmara (Karakulak *et al.*, 2020) and the Black Sea (Yağlıoğlu & Turan, 2021; Uzer *et al.*, 2024). Although the range extension of tropical fish species into the Mediterranean Sea and further north may occur naturally (Occhipinti *et al.*, 2011) as a result of global warming (Bianchi, 2007), the available evidence is unable to confirm this for the *A. cf. saxatilis/vaigiensis/troschelii* species complex in the Black Sea. The current specimen may instead have escaped or been released from an aquarium.

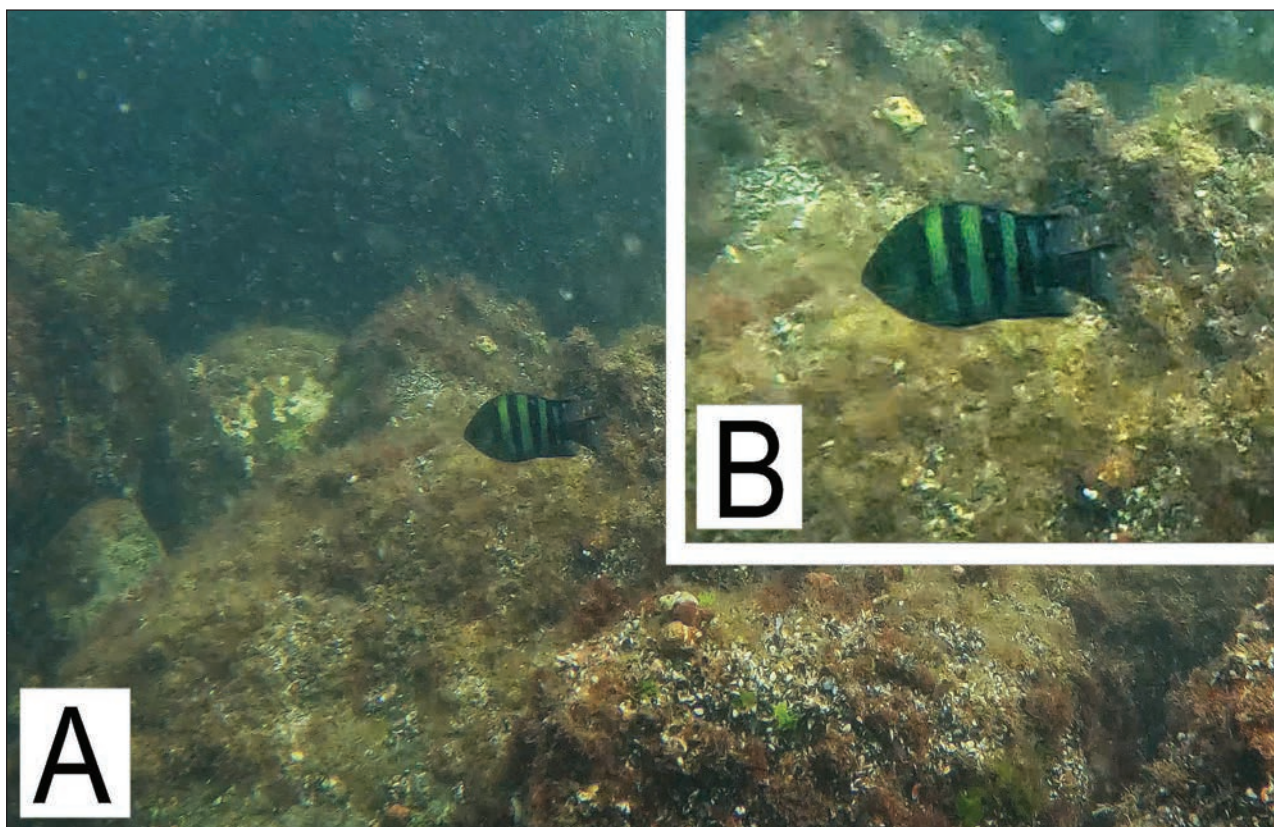


Fig. 2: (A) Captured frame from the video footage of the studied individual of the *A. cf. saxatilis/vaigiensis/troschelii* species complex recorded on 28 September 2024 at a depth between 5 and 7 m off the coast of Riva in the southwestern Black Sea, showing the surrounding substratum and vegetation; and (B) close-up of the specimen seen in panel A. (Photo: İsa Şentürk).

Sl. 2: (A) Zajet okvir iz videoposnetka primerka iz kompleksa vrst *A. cf. saxatilis/vaigiensis/troschelii*, posnetega 28. septembra 2024 na globini med 5 in 7 m ob obali Rive v jugozahodnem Črnem morju, ki prikazuje okoliški substrat in vegetacijo; in (B) primerek od blizu na plošči A. (Foto: İsa Şentürk).

The first record of *A. saxatilis* in the Mediterranean, reported by Azzurro et al. (2013), was soon followed by other records from several different regions of the Mediterranean (Deidun & Castriota, 2014, Tsadok et al., 2014; Bilecenoğlu, 2016; Vella et al., 2016). Froese and Pauly (2024) emphasised that *A. saxatilis* was being replaced in the Indo-Pacific region by the closely related *A. vaigiensis*. However, as noted in several recent studies, species identification of *Abudefduf* spp. based solely on external colouration has certain limitations. In a recent study, Bitar (2021) focused on the dark vertical bars seen on the bodies of *Abudefduf* spp. and provided a detailed morphological description of the appearance of the fifth vertical bar (continuous or discontinuous), which was accepted as an identifying morphological character for *A. saxatilis* according to Mediterranean literature until the end of 2020. Comparing numerous underwater photographs of *Abudefduf* spp. from Lebanese waters, Bitar (2021) concluded that relying solely on the appearance of the fifth vertical bar for species identification is flawed, as the feature can be observed in both *A. saxatilis*, *A. vaigiensis* and even *A. troschellii*. This means that observation and analyses of photographs are insufficient for an accurate identification of *Abudefduf* (Bitar 2021; in Kampouris & Sujariya, 2023) and may cause confusion and

misidentification, as does relying on videographic material alone. Recent studies by Vella et al. (2016) and Dragičević et al. (2021) addressed this issue, emphasising that while documenting *Abudefduf* spp. occurrences through underwater photos and videos is valuable, only molecular analysis combined with detailed morphological descriptions can confirm a specimen as a determinate *Abudefduf* species. In the absence of morphological and genetic evidence it is recommended that presumed specimens of one of the *Abudefduf* species be referred to in the Mediterranean as *A. cf. saxatilis/vaigiensis/troschellii*, as already practiced by Kampouris and Sujariya (2023) and Bilecenoğlu (2024). It is therefore more accurate to report the current specimen from the Black Sea as *A. cf. saxatilis/vaigiensis/troschellii* until another is collected in the region and confirmed as either of the four species through morphological and molecular analysis.

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PRVI ZAPIS O POJAVLJANJU PRIMERKA VRSTE IZ KOMPLEKSA *ABUDEFDUF* CF. *SAXATILIS*/*VAIGIENSIS*/*TROSCHELII* (PISCES: POMACENTRIDAE) IZ ČRNEGA MORJA

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POVZETEK

Osemindvajsetega septembra 2024 so s kamero posneli primerek vrste iz rodu *Abudefduf* Forsskål, 1775 v jugo-zahodnem Črnem morju, ob obali Turčije. Gre za prvi zapis o pojavljanju primerka iz kompleksa vrst *A. cf. saxatilis/vaigiensis/troschellii* v Črnem morju. Avtorji v prispevku navajajo podatke o obarvanosti in nekaterih morfoloških značilnostih primerka. Da bi natančno določili, katera vrsta iz tega kompleksa je prisotna v Črnem morju, bi morali odvzeti vzorec za podrobne morfometrične in genetske analize.

Ključne besedes: *Abudefduf*, Pomacentridae, Črno morje, invazija

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