

# ANNALES



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## VSEBINA / INDICE GENERALE / CONTENTS 2023(1)

BIOTSKA GLOBALIZACIJA  
*GLOBALIZZAZIONE BIOTICA*  
*BIOTIC GLOBALIZATION***Andrea LOMBARDO**

A New Mediterranean Record of the Sacoglossan *Thuridilla mazda* (Mollusca, Gastropoda) with a Review of its Distribution, Biology and Ecology ..... 1  
*Nov sredozemski zapis o pojavljanju polža zaškrgarja vrste Thuridilla mazda (Mollusca, Gastropoda) s pregledom njene razširjenosti, biologije in ekologije*

**Deniz ERGUDEN, Sibel ALAGOZ ERGUDEN & Deniz AYAS** On the Occurrence of *Lutjanus argentimaculatus* (Forsskål, 1775) in the South-Eastern Mediterranean, Turkey ..... 7  
*O pojavljanju mangrovskega rdečega hlastača Lutjanus argentimaculatus (Forsskål, 1775) v jugovzhodnem Sredozemskem morju (Turčija)*

**Adib SAAD, Lana KHREMA, Amina ALNESSER, Issa BARAKAT & Christian CAPAPÉ** The First Substantiated Record of Areolate Grouper *Epinephelus areolatus* (Serranidae) and Additional Records of Pilotfish *Naucrates ductor* (Carangidae) from the Syrian Coast (Eastern Mediterranean Sea) ..... 13  
*Prvi potrjen zapis o pojavljanju rdečepikaste kirnje, Epinephelus areolatus (Serranidae), in dodatni zapis o pojavljanju pilota, Naucrates ductor (Carangidae), iz sirske obale (vzhodno Sredozemsko morje)*

**Okan AKYOL & Vahdet UNAL**  
Additional Record of *Sillago suezensis* (Sillaginidae) from the Aegean Sea, Turkey ..... 19  
*Nov zapis o pojavljanju rdečemorskega mola Sillago suezensis (Sillaginidae) v turškem Egejskem morju*

SREDOZEMSKI MORSKI PSI  
*SQUALI MEDITERRANEI*  
*MEDITERRANEAN SHARKS***Hakan KABASAKAL, Uğur UZER & F. Saadet KARAKULAK**

Occurrence of Deep-Sea Squaliform Sharks, *Echinorhinus brucus* (Echinorhinidae) and *Centrophorus uyato* (Centrophoridae), in Marmara Shelf Waters ..... 27  
*Pojavljanje dveh globokomorskih morskih psov Echinorhinus brucus (Echinorhinidae) in Centrophorus uyato (Centrophoridae), v vodah Marmarskega šelfa*

**Khadija OUNIFI-BEN AMOR, Mohamed Mourad BEN AMOR, Marouène BDIOUI & Christian CAPAPÉ**

Additional Captures of Smoothback Angel Shark *Squatina oculata* (Squatinidae) from the Tunisian Coast ..... 37  
*(Central Mediterranean Sea)  
Nova ulova pegastega sklata Squatina oculata (Squatinidae) iz tunizijske obale (osrednje Sredozemsko morje)*

**Alessandro DE MADDALENA, Marco Giovanni BONOMO, Andrea CALASCIBETTA & Lorenzo GORDIGIANI**

On a Large Shortfin Mako Shark *Isurus oxyrinchus* (Lamnidae) Observed at Pantelleria (Central Mediterranean Sea) ..... 43  
*O velikem primerku atlantskega maka, Isurus oxyrinchus (Lamnidae), opaženega blizu Pantellerie (osrednje Sredozemsko morje)*

|   |       |  |     |
|---|-------|--|-----|
| IHTIOFAVNA  | FAVNA |  |     |
| ITTIOFAUNA  | FAUNA |  |     |
| ICHTHYOFAUNA  | FAUNA |  |     |
| <b>Christian CAPAPÉ, Christian REYNAUD &amp; Farid HEMIDA</b> The First Well-Documented Record of Maltese Skate <i>Leucoraja melitensis</i> (Rajidae) From the Algerian Coast (Southwestern Mediterranean Sea) .....                        | 51    | Nicola BETTOSO, Lisa FARESI, Ida Floriana ALEFFI & Valentina PITACCO Epibenthic Macrofauna on an Artificial Reef of the Northern Adriatic Sea: a Five-Years Photographic Monitoring .....              | 99  |
| <i>Prvi potrjeni primer o pojavljanju skata vrste Leucoraja melitensis (Rajidae) iz alžirske obale (jugozagahodno Sredozemsko morje)</i>  |       | <i>Epibentoška makrofauna na umetnem podvodnem grebenu v severnem Jadranu: pet letni fotografski monitoring</i>  |     |
| <b>Alessandro NOTA, Sara IGNOTO, Sandro BERTOLINO &amp; Francesco TIRALONGO</b> First Record of <i>Caranx cryos</i> (Mitchill, 1815) in the Ligurian Sea (Northwestern Mediterranean Sea) Suggests Northward Expansion of the Species ..... | 55    | <b>Roland R. MELZER, Martin PFANNKUCHEN, Sandro DUJMOVIĆ, Borut MAVRIČ &amp; Martin HEß</b> First Record of the Golden Coral Shrimp, <i>Stenopus spinosus</i> Risso, 1827, in the Gulf of Venice ..... | 113 |
| <i>Prvi zapis o pojavljanju modrega trnoboka Caranx cryos (Mitchill, 1815) v Ligurskem morju (severozahodno Sredozemsko morje) dokazuje širjenje vrste proti severu</i>   |       | <i>Prvi zapis o pojavljanju koralne kozice, Stenopus spinosus Risso, 1827, v Beneškem zalivu</i>   |     |
| <b>Alen SOLDO</b> The First Marine Record of Northern Pike <i>Esox lucius</i> Linnaeus, 1758 in the Mediterranean Sea .....   | 61    | <b>Abdelkarim DERBALI, Nour BEN MOHAMED &amp; Ines HAOUAS-GHARSALLAH</b> Age, Growth and Mortality of Surf Clam <i>Mactra stultorum</i> in the Gulf of Gabes, Tunisia .....                            | 119 |
| <i>Prvi morski zapis o pojavljanju ščuke Esox lucius Linnaeus, 1758 v Sredozemskem morju</i>  |       | <i>Starost, rast in smrtnost koritnice Mactra stultorum v Gabeškem zalivu (Tunizija)</i>   |     |
| <b>Mourad CHÉRIF, Rimel BENMESSAOUD, Sihem RAFRAFI-NOUIRA &amp; Christian CAPAPÉ</b> Diet and Feeding Habits of the Greater Weever <i>Trachinus draco</i> (Trachinidae) from the Gulf of Tunis (Central Mediterranean Sea) .....            | 67    | <b>Cemal TURAN, Servet Ahmet DOĞDU &amp; İrfan UYSAL</b> Mapping Stranded Whales in Turkish Marine Waters .....  | 127 |
| <i>Prehranjevalne navade morskega zmaja Trachinus draco (Trachinidae) iz Tuniškega zaliva (osrednje Sredozemsko morje)</i>  |       | <i>Popisovanje nasedlih kitov v turških morskih vodah</i>  |     |
| <b>Laith A. JAWAD &amp; Okan AKYOL</b> Skeletal Abnormalities in a <i>Sphyraena sphyraena</i> (Linnaeus, 1758) and a <i>Trachinus radiatus</i> Cuvier, 1829 Collected from the North-Eastern Aegean Sea, Izmir, Turkey .....                | 75    | <b>OBLETNICE ANNIVERSARI ANNIVERSARIES</b>   |     |
| <i>Skeletne anomalije na primerih vrst Sphyraena sphyraena (Linnaeus, 1758) in Trachinus radiatus Cuvier, 1829, ujetih v severovzhodnem Egejskem morju (Izmir, Turčija)</i>   |       | <b>Martina ORLANDO-BONACA &amp; Patricija MOZETIČ</b> Šestdeset let morskega biologa Lovrenca Lipeja .....   | 139 |
| <b>Deniz ERGUDEN, Sibel ALAGOZ ERGUDEN &amp; Deniz AYAS</b> A Rare Occurrence and Confirmed Record of Scalloped Ribbonfish <i>Zu cristatus</i> (Osteichthyes: Trachipteridae) in the Gulf of Antalya (Eastern Mediterranean), Turkey .....  | 89    | Kazalo k slikam na ovitku .....  | 141 |
| <i>O redkem pojavljanju in potrjeni najdbi čopaste kosice Zu criistatus (Osteichthyes: Trachipteridae) v Antalijskem zalivu (vzhodno Sredozemsko morje), Turčija</i>  |       | <i>Index to images on the cover</i> .....  | 141 |



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## ADDITIONAL RECORD OF *SILLAGO SUEZENSIS* (SILLAGINIDAE) FROM THE AEGEAN SEA, TURKEY

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### ABSTRACT

*Two specimens of the Lessepsian migrant *S. suezensis* were captured by trammel net on 2 August 2022 off Akyaka, Gökova Bay, Turkey at a depth of 2 m over a sandy bottom. This finding documents the third occurrence of *S. suezensis* in the south-eastern Turkish Aegean Sea. It is also the second northernmost record of the taxon in the Mediterranean Sea.*

**Key words:** smelt-whiting, Lessepsian migration, occurrence, eastern Mediterranean

## NUOVO RITROVAMENTO DI *SILLAGO SUEZENSIS* (SILLAGINIDAE) NEL MAR EGEO, TURCHIA

### SINTESI

*Due esemplari di *S. suezensis*, migrante lessepsiano, sono stati catturati con un trammaglio il 2 agosto 2022 al largo di Akyaka, nella baia di Gökova, in Turchia, a una profondità di 2 m su un fondale sabbioso. Questo risultato documenta il terzo ritrovamento di *S. suezensis* nel mar Egeo turco sud-orientale. Si tratta inoltre del secondo ritrovamento più settentrionale della specie nel mare Mediterraneo.*

**Parole chiave:** *Sillago suezensis*, migrazione lessepsiana, presenza, Mediterraneo orientale

## INTRODUCTION

The Sillaginidae family comprises 38 valid species (Fricke *et al.*, 2020) commonly known as smelt-whittings. Based on their elongated bodies, long snout, and long soft dorsal and anal fins as well as the horizontally positioned preopercles, the identification of the Sillaginidae at the level of family is easy (Golani *et al.*, 2014).

The species *Sillago suezensis* Golani, Fricke & Tikochinski, 2013 is endemic to the Northern Red Sea (Gulf of Suez, Egypt) and to date it is the only sillaginid species to have entered the Mediterranean from the Red Sea via the Suez Canal, i.e., through Lessepsian migration (Golani *et al.*, 2006, 2014; Golani & Fricke, 2018). In the Mediterranean, the species was initially misidentified as *S. sihama* (Golani *et al.*, 2014).

In the Mediterranean, *S. suezensis* was recorded for the first time (as *S. sihama*) in 1976 in the Lebanese coast by Mouneimne (1977) and in 1977 off the coasts of Israel (Ben-Tuvia, 1978). Along the Mediterranean coasts of Turkey, *S. suezensis* has been recorded from Iskenderun and Mersin Bays in the 1983–1984 (Güçü *et al.*, 1994) and 1997–1998

periods (Taskavak & Bilecenoglu, 2001); from off Karataş (Başusta & Erdem, 2000; Torcu & Mater, 2000); from Antalya (Innal *et al.*, 2015; Innal, 2020); and repeatedly from Iskenderun Bay (Erguden *et al.*, 2009; Keskin *et al.*, 2011; Yemişken *et al.*, 2014; Mavruk *et al.*, 2017; Erguden & Doğu, 2020). In the Levantine Sea, the species has also occurred in Egyptian waters since 1992 (cf. Halim & Rizkalla, 2011; Akel & Rizkalla, 2015; Rizkalla & Heneish, 2021), spreading as far as the waters of Cyprus (Katsanevakis *et al.*, 2009). Today, *S. suezensis* is common in Lebanese and Israeli waters (Bariche & Fricke, 2020; Galil *et al.*, 2020) as well as in the northeastern Mediterranean waters of Turkey (Erguden & Doğu, 2020). In the southeastern Aegean Sea, *S. suezensis* was recorded for the first time in the southern waters of the Datça Peninsula, Turkey, by Bilecenoglu (2004). The species has been recently reported from Gökova Bay, situated in the same region of the southeastern Turkish Aegean Sea (Çelik *et al.*, 2019), and from the Island of Rhodes, the latter being the first record for Greek waters (Tiralongo & Doumpas, 2019). Details of records of *S. suezensis* in Turkish waters are summarised in Table 1.

**Tab. 1: Records of *Sillago suezensis* in the Mediterranean and Aegean waters of Turkey (N: number of specimens collected; BT: bottom trawl; TN: trammel net; GN: gill net; HL: handline).**

**Tab. 1: Pojavljanje vrste *Sillago suezensis* v sredozemskih in egejskih vodah Turčije (N: število ujetih primerkov; BT: pridnena vlečna mreža; TN: trislojna mreža; GN: zabodna mreža; HL: ročna vrvice).**

| Location                   | Coordinates<br>Lat.N/Lon. E | Depth<br>(m) | Record Date               | N   | Size<br>(mm) | FG | References                    |
|----------------------------|-----------------------------|--------------|---------------------------|-----|--------------|----|-------------------------------|
| Mediterranean Sea, Turkey  |                             |              |                           |     |              |    |                               |
| Iskenderun and Mersin Bays | ?                           | ?            | 1983-1984                 | 5   | 129-203 TL   | BT | Güçü <i>et al.</i> (1994)     |
| Off Karataş                | ?                           | ?            | 1991-1994                 | 2   | 149-173 TL   | ?  | Torcu & Mater (2000)          |
| Off Karataş                | ?                           | 20-30        | 1994-1996                 | 7   | 65-166 TL    | BT | Başusta & Erdem (2000)        |
| Iskenderun and Mersin Bays | ?                           | 10-80        | 1997-1998                 | 108 | 94-203 TL    | BT | Taskavak & Bilecenoglu (2001) |
| Iskenderun Bay             | ?                           | 12-120       | 2007-2008                 | 23  | 87-205 TL    | BT | Erguden <i>et al.</i> (2009)  |
| Iskenderun Bay             | ?                           | 54-64        | 2007-2008                 | ?   | ?            | BT | Keskin <i>et al.</i> (2011)   |
| Iskenderun Bay             | ?                           | 31-110       | 2010-2011                 | 4   | 170-181 TL   | BT | Yemisken <i>et al.</i> (2014) |
| Antalya Bay                | ?                           | ?            | 2011-2012                 | 149 | 122-176 TL   | TN | Innal <i>et al.</i> (2015)    |
| Iskenderun Bay             | ?                           | 40           | 2013-2014                 | 872 | 115-242      | BT | Erguden & Doğu (2020)         |
| Brackish waters in Antalya | ?                           | ?            | 2014-2017                 | ?   | ?            | ?  | Innal (2020)                  |
| Aegean Sea, Turkey         |                             |              |                           |     |              |    |                               |
| Palamutbüyü, Datça         | 36°40 - 27°28               | 12           | 7 <sup>th</sup> July 2004 | 2   | 148-157 SL   | GN | Bilecenoglu (2004)            |
| Gökova Bay                 | 37°02 - 28°19               | 2            | 9 <sup>th</sup> July 2018 | 1   | 174 TL       | HL | Çelik <i>et al.</i> (2019)    |
| Gökova Bay                 | 37°02 - 28°18               | 2            | 2 <sup>nd</sup> Aug. 2022 | 2   | 174-175 TL   | TN | This study                    |

Continuous monitoring of the occurrence in space and time of marine non-indigenous species is of fundamental importance for assessing the levels of biological invasions, especially in marine regions such as the Aegean Sea, a basin of the Mediterranean Sea under high impact of thermophilic Lessepsian species, in particular in its southeastern sector (Katsanevakis *et al.*, 2020).

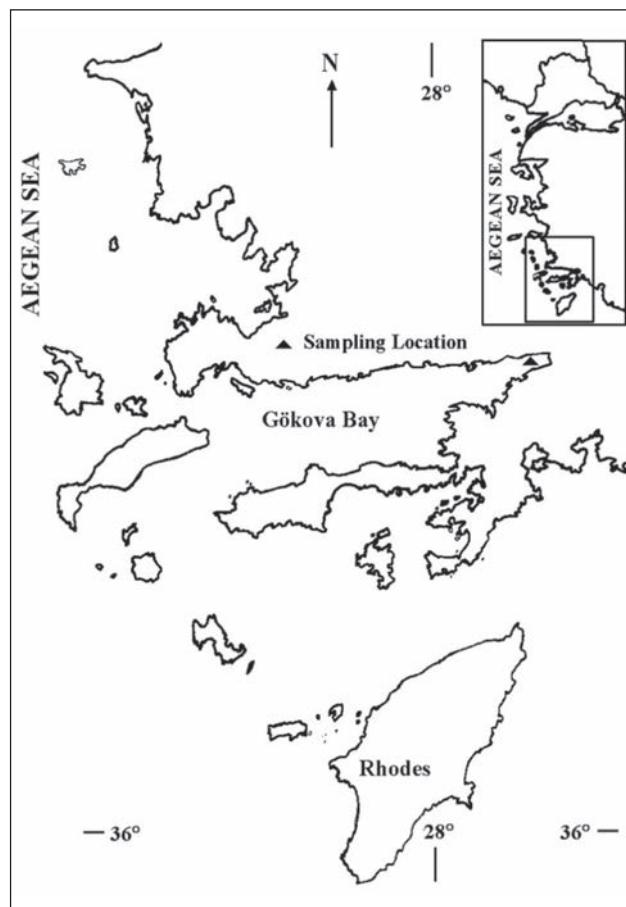
The paper documents a new record of the Lessepsian migrant *S. suezensis* in the Aegean Sea (eastern Mediterranean).

## MATERIAL AND METHODS

On 2 August 2022, two specimens of *Sillago suezensis* were captured by trammel net off Akyaka, Gökova Bay ( $37^{\circ}02'56''N$ ,  $28^{\circ}18'47''E$ , Fig. 1) at a depth of 2 m over a sandy bottom. The specimens were fixed in a 5% formaldehyde solution and then measured to the nearest mm with a caliper and weighed. The samples are deposited in the fish collection of the Faculty of Fisheries, Ege University (ESFM-PIS/2022-004).

## RESULTS AND DISCUSSION

Short descriptive characteristics of the *S. suezensis* specimens from Gökova Bay (Fig. 2): body elongated; head conical with pointed snout; small and terminal mouth with villiform teeth, upper jaw slightly longer than the lower; two dorsal fins close to each other, the first set higher than the second; second dorsal fin opposite to anal fin; absence of scales on the preoperculum and operculum. Body colour of fresh specimen silvery yellow, growing paler along



**Fig. 1: Sampling location (black triangle) of *Sillago suezensis* in the Aegean Sea.**

**Sl. 1: Lokaliteta ulova (črn trikotnik) vrste *Sillago suezensis* v Egejskem morju.**



**Fig. 2: The largest specimen of *Sillago suezensis* captured from Gökova Bay, SE Aegean Sea (ref. ESFM-PIS/2022-004) (Photo: O. Akyol).**

**Sl. 2: Večji primerek vrste *Sillago suezensis*, ujet v zalivu Gökova, JV Egejsko morje (ref. ESFM-PIS/2022-004) (Foto: O. Akyol).**

**Tab. 2: Morphometric measurements in mm, also expressed as percentages of total length (%TL), and head length (%HL), meristic counts, and weights recorded in the two specimens of *Sillago suezensis* (ref. ESFM-PIS/2022-004) captured from Gökova Bay, SE Aegean Sea.**

**Tab. 2: Morfometrične meritve v mm in izražene kot delež telesne dolžine (%TL), in dolžine glave (HL%), meristična štetja in teža dveh primerkov vrste *Sillago suezensis* (ref. ESFM-PIS/2022-004), ujetih v zalivu Gökova, JV Egejsko morje.**

| Specimens              | Specimen 1 |              | Specimen 2 |              |
|------------------------|------------|--------------|------------|--------------|
| Measurements           | mm         | Proportion % | mm         | Proportion % |
| Total length (TL)      | 175        |              | 174        |              |
| Standard length (SL)   | 154        | 88.0 TL      | 153        | 87.9 TL      |
| Predorsal fin length   | 51         | 29.1 TL      | 50         | 28.7 TL      |
| Prepectoral fin length | 44         | 25.1 TL      | 44         | 25.3 TL      |
| Pre-anal fin length    | 88         | 50.3 TL      | 87         | 50.0 TL      |
| Head length (HL)       | 42         | 24.0 TL      | 42         | 24.1 TL      |
| Eye diameter           | 9          | 21.4 HL      | 9          | 21.4 HL      |
| Preorbital length      | 17         | 40.5 HL      | 17         | 40.5 HL      |
| <b>Meristic counts</b> |            |              |            |              |
| 1st Dorsal fin rays    | X          |              | X          |              |
| 2nd Dorsal fin rays    | I+21       |              | I+21       |              |
| Anal fin rays          | II+18      |              | II+18      |              |
| Pelvic fin rays        | I+5        |              | I+5        |              |
| Pectoral fin rays      | 16         |              | 16         |              |
| Weight (g)             | 44.2       |              | 37.5       |              |

the belly; a longitudinal silvery stripe present on the midlateral line; both dorsal fins and caudal fin dusky, other fins pale. All determined measurements, proportions, meristics (Tab. 2) and colour patterns are in accordance with those given for *S. suezensis* by Bilecenoglu (2004), Golani et al. (2006, 2014), Innal et al. (2015) and Çelik et al. (2019).

While the *S. suezensis*, following the Lessepsian migration pattern along Anatolian coasts, has been spreading westwards as far as the Aegean Sea (Bilecenoglu, 2004), a rising trend in the abundance of its populations in the Levant Sea has been observed (see also Table 1). This species has in fact acquired commercial value in Israel (Golani et al., 2014) and in the southeastern waters of Turkey (Yemisken et al., 2014; Innal, 2015). For example, in a trawl fishery survey carried out from 2004 to 2015, *S. suezensis* resulted the fifth most abundant Lessepsian

fish (4.73% of total teleost biomass) in İskenderun Bay (Mavruk et al., 2017).

This study presents the third record of *S. suezensis* from the southeastern Turkish Aegean Sea. For the time being, the occurrence of this species in the Aegean Sea appears sporadic, but the frequency of findings in the southeastern part of the basin reported in the last four years, both from Turkish and Greek waters, may be taken as indication of an ongoing establishment of this Lessepsian fish in the area. In addition, this is the second northernmost record of the species in the Mediterranean Sea.

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## NOV ZAPIS O POJAVLJANJU RDEČEMORSKEGA MOLA *SILLAGO SUEZENSIS* (SILLAGINIDAE) V TURŠKEM EGEJSKEM MORJU

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### POVZETEK

Dva primerka rdečemorskega mola *Sillago suezensis* sta bila 2. avgusta 2022 ujeta v trislojno mrežo v vodah blizu Akyaka v zalivu Gökova (Turčija) na 2 m globine na peščenem dnu. To je tretji primer pojavljanja vrste *S. suezensis* v jugovzhodnem turškem delu Egejskega morja in hkrati drugi najsevernejši primer o pojavljanju tega taksona v Sredozemskem morju.

**Ključne besede:** rdečemorski mol, lesepska selitev, pojavljanje, vzhodno Sredozemsko morje

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