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A FUGITIVE LESSEPSIAN FISH IN A SEA-CAGE FARM IN THE AEGEAN SEA: *STEPHANOLEPIS DIASPROS* (MONACANTHIDAE)

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ABSTRACT

*This paper presents the first recorded sighting of a *Stephanolepis diaspros* school at a sea-cage fish farm in the Bay of Izmir, north-eastern Aegean Sea. On 17 December 2024, a group of 20 individuals of *S. diaspros* was observed around a sea cage used for rearing meagre (*Argyrosomus regius*) off Urla, at a depth of 30 m. This study not only documents the first observation of *S. diaspros* in a fish farm in the northern Aegean Sea but also provides the first evidence of this fish species intruding into sea cages.*

Key words: Reticulated leatherjacket, behaviour, habitat, feeding, meagre

PESCE LESSEPSIANO FUGGITIVO IN UN ALLEVAMENTO IN GABBIA NEL MAR EGEO: *STEPHANOLEPIS DIASPROS* (MONACANTHIDAE)

SINTESI

*L'articolo presenta il primo avvistamento registrato di un branco di *Stephanolepis diaspros* in un allevamento di pesci in gabbia nella baia di Smirne, nell'Egeo nord-orientale. Il 17 dicembre 2024, un gruppo di 20 esemplari di *S. diaspros* è stato osservato intorno a una gabbia marina utilizzata per l'allevamento dell'ombrina boccadoro (*Argyrosomus regius*) al largo di Urla, a una profondità di 30 m. Questo studio non solo documenta la prima osservazione di *S. diaspros* in un allevamento ittico nel mare Egeo settentrionale, ma fornisce anche la prima prova dell'intrusione di questa specie ittica nelle gabbie marine.*

Parole chiave: monacanto reticolato, comportamento, habitat, alimentazione, ombrina boccadoro

INTRODUCTION

The reticulated leatherjacket, *Stephanolepis diaspros* Fraser-Brunner, 1940 (Tetraodontiformes: Monacanthidae), is a demersal marine fish typically encountered on rocky bottoms with vegetation, but also on sandy and muddy substrates with seagrass, at depths between 20 and 50 m (Golani *et al.*, 2006; Froese & Pauly, 2024). It feeds on small rock-dwelling organisms that it plucks from among the algae (Golani *et al.*, 2006).

The natural distribution of *S. diaspros* includes the Red Sea and the Arabian Gulf. The species entered the Mediterranean via the Suez Canal and is considered one of the earliest Lessepsian immigrants, now well established in the eastern Mediterranean (Golani *et al.*, 2002, 2006, 2021; Golani, 2010; Froese & Pauly, 2024). The species has also been recorded in the central Mediterranean, including Malta; Lampedusa, the Egadi Islands, and Sicily in Italy (Deidun *et al.*, 2015; Balistreri & Paraspuro, 2015); Tunisia (Ben Amor & Capapé, 2008; Zouari-Ktari *et al.*, 2008); and as far north as the Sea of Marmara (Bilecenoğlu & Yokeş, 2013; Bilecenoğlu, 2024) and the northern Adriatic Sea (Lipej *et al.*, 2014).

In Turkish waters, *S. diaspros* was first reported by Koswig (1950). Since then, it has been documented in studies from the Iskenderun Bay in the NE Mediterranean Sea (Gücü *et al.*, 1994; Torcu & Mater, 2000; Başusta & Erdem, 2000; Taşkavak & Bilecenoğlu, 2001; Sangun *et al.*, 2007; Ergüden *et al.*, 2009; Yemişken *et al.*, 2014); Cyprus (Iglésias & Frotté, 2015); the Gulf of Antalya (Türker *et al.*, 2020); the SE Aegean Sea (Öz *et al.*, 2007; Corsini-Foka *et al.*, 2010; Servonnat & Drakulic, 2015; Akyol *et al.*, 2018); and the NE Aegean Sea (Akyol & Özgül, 2015; Metin & Akyol, 2021).

In the Aegean Sea, the species has been expanding its distribution range towards the northern latitudes. In 2023, Akyol (2023) documented *S. diaspros* among the 15 Lessepsian fish species found in the Bay of Izmir. This fish has occasionally been observed in both sandy areas and seagrass meadows and is typically caught using fishing lines and gillnets in the Bay of Izmir (fisherman E. Akgün, *pers. comm.*). Additionally, *S. diaspros* was observed on 31 May 2024 around the artificial reef near Hekim Island in the Bay of Izmir (*pers. obs.* by the second and third authors). This ichthyologic note presents the first sighting of a *S. diaspros* school within a sea-cage fish farm in the Bay of Izmir, north-eastern Aegean Sea.

MATERIAL AND METHODS

On 17 December 2024, a group of *Stephanolepis diaspros* was observed at a sea cage used for rearing meagre (*Argyrosomus regius*) off Urla, Bay of Izmir (coordinates: 38°26'48"N, 26°36'18"E), at a depth of 30 m (Fig. 1). Scientific diving was conducted around the sea cages and the intruding fish were recorded using a GoPro 10 Hero camera. In-depth interviews were car-

ried out with the farm owner (manager) to obtain detailed information. The water temperature at the diving site was 17 °C. Species identification and taxonomic nomenclature of an observed specimen follow Golani *et al.* (2006), Froese and Pauly (2024).

RESULTS AND DISCUSSION

The species description is based on the specimens observed in the video footage: body deep, laterally compressed and rounded ventrally; a single strong spine with barbs on posterior edge of first dorsal fin, originating just above the posterior margin of the orbit; second dorsal fin just above and parallel to the anal fin; pelvic fin poorly developed, resembling a simple flap of skin; snout pointed, with a small terminal mouth containing incisor-like teeth; slit-like gill opening above origin of pelvic fin; body colour brownish green or greyish green with a complex pattern of spots, dark horizontal lines, and sinuous lines; two dark bands on convex caudal fin separated by a pale band, dorsal and anal fins yellow to orange. Based on this description, which aligns with those found in Golani *et al.* (2006), and Froese and Pauly (2024), the specimens were positively identified as *Stephanolepis diaspros* Fraser-Brunner, 1940 (Fig. 2).

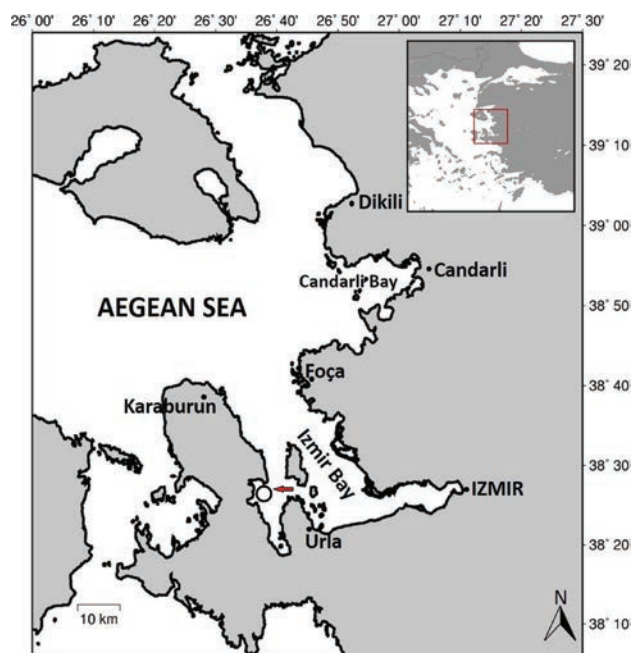


Fig. 1: Sampling site (circle) of the *Stephanolepis diaspros* observed in a sea cage in the Bay of Izmir, north-eastern Aegean Sea.

Sl. 1: Zemljevid obravnavanega območja z lokaliteto (krogec), kjer je bila vrsta *Stephanolepis diaspros* opažena v ribjih kletkah v Izmirskem zalivu, severovzhodno Egejsko morje.



Fig. 2: A school of *Stephanolepis diaspros* with reared *Argyrosomus regius* in a sea cage of Izmir Bay, northeastern Aegean Sea.

Sl. 2: Jata afriških kostorogov (*Stephanolepis diaspros*) z gojenimi primerki hame (*Argyrosomus regius*) v ribjih kletkah v Izmirskem zalivu, severovzhodno Egejsko morje.

In our preliminary observations, a group of 20 *S. diaspros* individuals of approximately 15 cm in length were observed (Fig. 2) congregating at the base of the net and consuming the algae that adhered to the net. While the school of meagre were swimming in the upper part of the net cage, showing no interest in the Lessepsian fish group, *S. diaspros* appeared to be avoiding contact with the farmed fish (Fig. 2).

In-depth interviews with the managers revealed that, in the past few years, juvenile *S. diaspros* have entered the cages during the annual net changes, remaining resident for approximately eight to nine months and departing during the subsequent net change. Cultivated meagre (*A. regius*) in sea cages are initially fed a diet of fresh fish, transitioning to pellet food during summer months. According to farm managers, when the meagre is hungry, it may pursue *S. diaspros*, sometimes chasing, biting, or even killing it. Their diet consists of fouling organisms, algae, and bait fish accumulating at the base of the net (S. Şanlı & K. Şanlı, *pers. comm.*).

Pelagic fish are strongly attracted to floating structures, including coastal cage farms, and may form highly dense aggregations. It is well-known that wild fish communities can be attracted to sea-cage farms; consequently, sea cages as floating structures have been categorised as Fish Aggregation Devices (FADs) (Dempster & Taquet, 2004; Sanchez-Jerez *et al.*, 2007). A recent study (Akyol *et al.*, 2020) identified a total of 39 wild species around the six fish farms in the Turkish Aegean Sea. Notably, one single specimen of *S. diaspros* was documented in proximity of a

sea-cage farm in Güllük Bay in the south-eastern Aegean Sea (Akyol *et al.*, 2020).

The tendency of juvenile demersal fish to enter floating cages in pelagic waters may be attributed to the ease of access to food in these environments. While the level of interest in pellet food for *S. diaspros* remains equivocal, this could be determined through of stomach content analyses. Due to lost pellets, wild fish may feed on excess feed around coastal fish farms. If this occurs, the condition of wild fish can improve within no-take areas (leasehold areas) and their lipid profiles may become modified (Izquierdo-Gomez *et al.*, 2015). A recent study documented a *S. diaspros* specimen with a total length of 305 mm (weighing 464 g) captured by hand-line in the Bay of Izmir, which has been recorded as the maximum reported size (Metin & Akyol, 2021). However, FishBase (Froese & Pauly, 2024) lists 250 mm as the maximum size. We believe this individual likely exhibited signs of further growth due to feeding near sea cages.

In conclusion, this study not only reports the first observation of *S. diaspros* in a fish farm in the northern Aegean Sea but also provides the first recorded instance of this species intruding into sea cages.

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UBEŽNI LESEPSKI MIGRANT IZ RIBOGOJNICE V EGEJSKEM MORJU:
STEPHANOLEPIS DIASPROS (MONACANTHIDAE)

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POVZETEK

*Pričujoči zapis predstavlja prvo zabeleženo pojavljanje jate afriškega kostoroga (*Stephanolepis diaspros*) v bližini ribogojnice s kletkami v Izmirskem zalivu v severovzhodnem Egejskem morju. Sedemnajstega decembra 2024 so opazili jato 20 osebkov v bližini kletke z gojenimi primerki hame (*Argyrosomus regius*) v vodah blizu Urle, na globini 30 m. Poleg dejstva, da gre za prvi zapis o opazovanju afriškega kostoroga v severnem Egejskem morju, je to tudi prvi zabeležen primer vdora te vrste v morske kletke.*

Ključne besede: afriški kostorog, vedenje, habitat, prehranjevanje, hama

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