

## Marine Record

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# First record of the bluespotted dottyback *Pseudochromis persicus* (Teleostei: Pseudochromidae) in the Mediterranean Sea

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## Abstract

We report the first non-indigenous dottyback *Pseudochromis persicus* record in the Mediterranean Sea. A single individual was documented several times at the same location on October 2024 in Bat Galim reef, a shallow rocky shelf of Rosh Carmel underwater ridge on the northern coast of Israel. This record represents the first sighting of Pseudochromidae, a family native to the Indo-Pacific Ocean, in the Mediterranean Sea. It is also the first record of *P. persicus* beyond its native range in the Persian Gulf and the Arabian Sea.

## Introduction

Since the construction of the Suez Canal in the late nineteenth century, the Mediterranean Sea has been exposed to the largest bioinvasion recorded in modern history (Galil, 2023). The proximity to the Suez Canal has turned the eastern Mediterranean, and the Israeli coast in particular, into a hotspot and dispersal hub of non-indigenous species (NIS), with more than a hundred alien fish recorded to date, most of them of Red Sea and Indo-Pacific origin (Golani, 2021). Among the non-indigenous fish reported from the Mediterranean, only few are members of cryptobenthic families (following the definition by Brandl *et al.*, 2018) and strictly reef-associated.

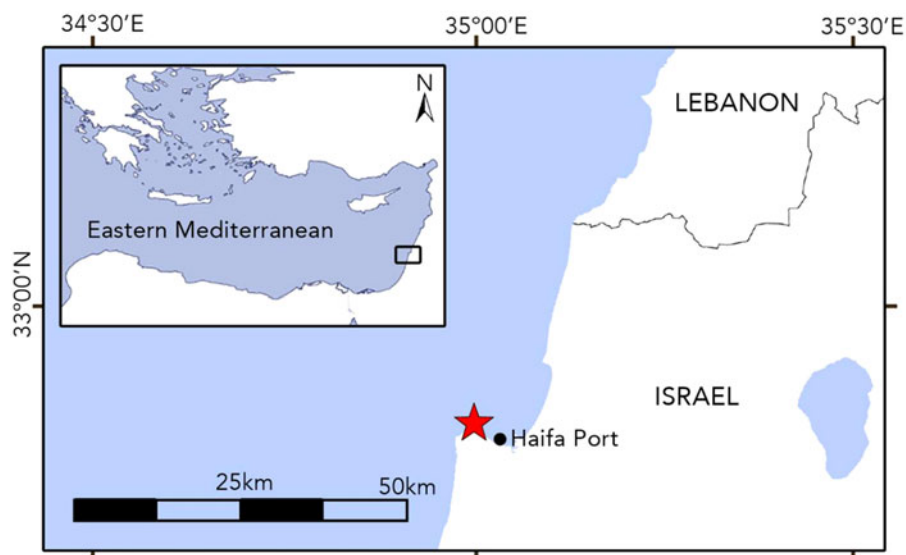
The Pseudochromidae (commonly known as dottybacks) is a family of small (usually less than 10 cm SL), reef-associated fishes, containing 154 species in 24 genera, that are widely distributed throughout tropical and subtropical regions of the Indo-Pacific (Froese and Pauly, 2024). Dottybacks are often brightly coloured, with many species (e.g. *Pseudochromis fridmani*, *P. aldabraensis*, *P. elongatus*, *P. springeri*) popular in the marine aquarium trade. Pseudochromines, which form the largest subfamily, are mainly associated with small caves and interstices in sponges and branched corals (Gill, 2004). Recently, we observed and photographed a bluespotted dottyback, *P. persicus* Murray, 1887, off the Mediterranean coast of northern Israel. *Pseudochromis persicus* is native to the western Indian Ocean, known mainly from the Persian Gulf and the Arabian Sea (Gill and Mee, 1993; Gill, 2004; Alavi-Yeganeh *et al.*, 2024). This is one of the largest species in its genus, attaining approximately 15 cm TL (Gill, 2004). In its native range, it has been observed in shallow reef areas ranging from 1 to 25 m deep, where it feeds on small crustaceans and benthic invertebrates (Gill, 2004). In this article, *P. persicus* is reported from the eastern Mediterranean Sea for the first time, more than 4000 km from its natural distribution.

## Materials and methods

On 14 October 2024, a single individual of *P. persicus* was detected during a recreational snorkelling activity in Bat Galim, Haifa, on the northern coast of Israel (32°50'02.6"N, 34°58'08.3"E) in the eastern Mediterranean Sea (Figure 1). The reef in Bat Galim is a large continuous limestone rocky platform and a part of the upper Rosh Carmel underwater ridge. The individual was observed at a depth of 2 m, where the reef is characterized by large flat areas interrupted by small ledges and crevices. The individual was observed on two more occasions, on 24 October and 26 October, at the same location where it was first detected. On 29 October the fish was not observed at the site. The individual was photographed in stills and video using an underwater camera Olympus Tough TG-7 and its total length was estimated *in situ*. Species identification was based on the images and followed Gill (2004). Identification was further validated through personal communication with Gill A. based on the photos taken.

## Results

We report the first sighting of *P. persicus* in the Mediterranean Sea. A mature individual, estimated at 14 cm TL, was observed swimming in and out of a rock crevice, displaying apprehensive behaviour towards the observers. Video of the sighting can be accessed on YouTube (<https://www.youtube.com/watch?v=CeLruWLMYam&t=2s>).



**Figure 1.** Precise locality where *Pseudochromis persicus* was sighted.

### Systematics

Class Actinopterygii  
 Order Perciformes  
 Family Pseudochromidae Müller & Troschel, 1849  
 Genus *Pseudochromis* Rüppell, 1835  
*Pseudochromis persicus* Murray, 1887  
 Common name: Bluespotted dottyback  
 Type locality: Persian Gulf

### Description and diagnostics

Brief description of the Mediterranean specimen observed, based on photographs (Figure 2): Body elongated and slightly

compressed laterally. Eyes protruding. The mouth oblique with thick lips and a slight gape, featuring one pair of enlarged caniniform teeth anteriorly on the upper jaw and one pair on the lower jaw. Lower lip incomplete (interrupted at the symphysis). The maxilla extending to a vertical at anterior edge of the eye. Caudal fin rounded. Live coloration of the head and body dark blue to brown, and the dorsal, pelvic, anal and caudal fins dark blue with bright blue margins and spots. The spots on the dorsal and anal fins organized in two rows at the base of the fin. Spots on the caudal fin scattered in at least 11 rows along caudal fin rays. The pectoral fins rusty yellow to orange. Cheeks with two bright blue oblique stripes stretching upwards from the margins of the upper lip. The upper stripe short and stretches to two-thirds



**Figure 2.** *Pseudochromis persicus* in the Mediterranean Sea. Photos by S. Ohayon.

the distance from the eye. The lower stripe longer, interrupted and reaching below the posterior margin of the orbit. Lower part of the cheeks and operculum with faint blue spots and streaks. Iris reddish brown and a bright yellowish suboval ring framing the pupil. A large black blotch about the size of eye diameter on the operculum behind upper edge of preopercle, edged anteriorly with a bright blue fine bar, nearly vertical. *Pseudochromis persicus* highly resembles *P. omanensis* in meristic, coloration, morphometric details, and in attaining a large size (both reach ~15 cm TL) (Gill, 2004). However, the observed individual had bright blue to turquoise spots scattered over the sides of the body, including its anterior part, which are considered a distinguishing characteristic of *P. persicus* (see: Gill and Mee, 1993; Gill, 2004; Anthony Gill, pers. comm.).

## Discussion

The live coloration and size of the pseudochromid observed in Bat-Galim reef, Israel, agrees with the description remarks of *P. persicus* by Gill (2004), and distinguishes it from other congeneric species. The combination of a dark body, brown to rusty pectoral fins, pelvic, dorsal, anal and caudal fins with bright blue spots and margins, suboval line around the pupils and territorial behaviour, distinguishes it from any other cryptobenthic fish. While nine *Pseudochromis* species are known from the Red Sea (Golani and Fricke, 2018), *P. persicus*, known only from the Persian Gulf and Arabian Sea, is the first non-indigenous pseudochromid documented in the Mediterranean Sea. Its remote native range, combined with limited swimming abilities, raises the assumption that *P. persicus* arrived in the Mediterranean Sea through the Suez Canal in ships' ballast water. The proximity of Bat Galim reef to Haifa port strengthens this possible pathway. Only two more species, *Istiblennius meleagris* and *Tridentiger trigonocephalus*, have thus far likely reached the region by shipping (Goren *et al.*, 2009; Rothman *et al.*, 2020; Golani, 2021). Nonetheless, it is also possible that *P. persicus* is present but rare in the Red Sea, and interestingly, high probability of occurrence in the Red Sea was modelled by AquaMaps (2019). The Steinhardt's shrimp-goby (*Cryptocentrus steinhardti* Goren and Stern, 2021), for example, another benthic fish with cryptic behaviour, was discovered in the Mediterranean coast of Israel before it was first sighted in the Gulf of Aqaba, where it is native and presumably rare (sighting available in iNaturalist: <https://israel.inaturalist.org/observations/106481693>). An alternative introduction pathway may be through the marine aquarium trade, where the brightly coloured members of the family Pseudocromidae are popular. Nonetheless, to our best knowledge, *P. persicus* is not a common species in the trade.

The Israeli coast serves as an important entry station and breeding ground for NIS (Galil *et al.*, 2021). Additionally, the discovery rate of new non-indigenous fishes in Israeli waters has been rising since the early 2000s, likely due to successive enlargements of the Suez Canal and research effort (Galil *et al.*, 2021). A recent spatio-temporal analysis suggests that most NIS fishes arriving at the Mediterranean require approximately four years to spread from the first record towards the second region of detection, and 22 years in total to reach the central Mediterranean Sea from the Suez Canal (Vagenas *et al.*, 2024). The study also highlights that over half of the introduced fishes have been established in the Mediterranean in less than 10 years. Once an NIS is established, management or other controlling measures are limited or impossible; hence, prevention measures are considered the only effective strategy. Early detection of species with limited dispersal capabilities, in enclosed or semi-enclosed areas (e.g. aquaculture

infrastructures, marinas and lagoons) may facilitate eradication attempts. With regards to cryptobenthic reef fish, early detection and monitoring programs may be facilitated by engaging citizen scientists, equipped with waterproof cameras.

**Data.** The authors confirm that the data supporting the findings of this study are available within the article.

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**Author contributions.** S. Ohayon and W. Naser detected and documented the fish and wrote the manuscript. S. B.-S. Rothman identified the specimen and equally participated in writing the manuscript.

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**Competing interest.** None.

**Ethical standards.** This article did not require any research permit.

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