FIRST RECORD OF THE INDIAN OCEAN TWOSSPOT CARDINALFISH,
CHEILODIPTERUS NOVEMSTRIATUS (ACTINOPTERYGII: PERCIFORMES:
APOGONIDAE), FROM TURKISH MARINE WATERS

Cemal TURAN1*, Deniz ERGUDEN1, Necdet UYGUR1, Mevlut GURLEK1,
Zeliha A. ERDOGAN 2, Bektas SONMEZ3, Ali UYAN1, Serpil KARAN1, and Servet A. DOGDU1

1Faculty of Marine Sciences and Technology, Mustafa Kemal University, Iskenderun, Hatay, Turkey
2Cumhuriyet University Süşehri Timur Karabal Vocational School, Fisheries Program, Sivas, Turkey
3Balıkesir University, Science Faculty, Biology Department, Balıkesir, Turkey

Turan C., Erguden D., Uygur N., Gurlek M., Erdogan Z.A., Sonmez B., Uyan A., Karan S., Dogdu S.A.
2015. First record of the Indian Ocean twospot cardinalfish, Cheilodipterus novemstriatus (Actinopterygii: Perciformes: Apogonidae), from Turkish marine waters. Acta Ichthyol. Piscat. 45 (3): 319–322.

Abstract. Indian Ocean twospot cardinalfish, Cheilodipterus novemstriatus (Rüppell, 1838), is recorded for the first time from the Turkish marine waters. Two specimens of C. novemstriatus were sampled with a purse seiner on 1 December 2014, and also a school of C. novemstriatus was photographed during scuba diving at a depth of 13 m on a rocky surface on 8 December 2014 in the Cevlik coast, Iskenderun Bay, north-eastern Mediterranean of Turkey. With the present report, the number of alien cardinal fish species reported in the Turkish coasts has reached five.

Keywords: fish, first country record, Lessepsian migration, colonisation, range extension

Nowadays many alien fish species, which entered the Mediterranean via the Suez Canal, have established dense populations in the north-eastern coastal waters of Turkey (Ergüden and Turan 2013). Some species have become abundant in the eastern Mediterranean ichthyofauna and also acquired an economic importance within the regional fisheries (Bariche et al. 2004).

To date, the family Apogonidae is represented in the eastern Mediterranean Sea by four genera and six species (Golani et al. 2002, Gon and Randall 2003, Froese and Pauly 2014), namely Apogon imberbis (Linnaeus, 1758); Jaydia queketti (Gilchrist, 1903); Jaydia smithi Kohlhaus, 1970; Apogonichthyoides pharaonis (Bellotti, 1874); Cheilodipterus novemstriatus (Rüppell, 1838); and Ostorhinchus fasciatus (White, 1790). These five species are of Indo-Pacific origin while only Apogon imberbis is of Atlantic provenance. In recent years, cardinal fish species successfully established in the north-eastern Mediterranean coast of Turkey (Eryilmaz and Dalyan 2006, Goren et al. 2009, Turan 2010) and are now components of the Turkish ichthyofauna (Ergüden et al. 2013).

The Indian Ocean twospot cardinalfish, Cheilodipterus novemstriatus, was first reported in the Mediterranean off Tel Aviv in June 2010 (Goren et al. 2010). Thereafter, Bariche and Azzurro (2012) recorded two specimens off shore, north of Beirut, Lebanon in July–August 2012. Lately, C. novemstriatus was reported to form dense aggregations along the Israeli coasts (Rothman et al. 2013).

In the present report, two specimens of Indian Ocean twospot cardinalfish, Cheilodipterus novemstriatus (Fig. 1) were caught by purse seiner on sandy-muddy bottom at a depth of 15 m on 1 December 2014 from the near Cevlik harbour, Iskenderun Bay, north-eastern Mediterranean coast of Turkey (36°07′N, 35°54′E). The collected two specimens were preserved in 4% formalin and deposited at the ichthyological collection of Marine Science and Technology Faculty, Mustafa Kemal University (Catalogue numbers: MSM-PIS/2014-5 and MSM-PIS/2014-6) (Fig. 1). Moreover, a school of numerous individuals of C. novemstriatus were photographed from the same location during scuba diving at a depth of 13 m on a rocky surface on 7 December 2014 (Fig. 2).

The identification of the specimens collected and observed in the Cevlik province were similar with those previously reported in Israel and Lebanon (Goren et al. 2010, Bariche and Azzuro 2012). Morphometric measurements
Fig. 1. Indian Ocean twospot cardinalfish, *Cheilodipterus novemstriatus*, from the Cevlik harbour (Iskenderun Bay)

Fig. 2. Underwater photos of Indian Ocean twospot cardinalfish, *Cheilodipterus novemstriatus*, at Cevlik coast, Iskenderun Bay
of the specimens were made to the nearest 0.01 mm using
digital calliper. All measurements, counts, the morpholog-
ical descriptions and colours agree with the descriptions
given by Gon and Randall (2003) and Goren et al. (2010).
The presently reported finding constitutes the first re-
cord of Cheilodipterus novemstriatus in the Turkish ma-
rine waters, thus increasing up to five the total number
of alien cardinal fish species reported from the Turkish
coastal waters. The occurrence of C. novemstriatus in the
Mediterranean Sea can be attributed to migration from the
Red Sea via the Suez Canal, and the fish were apparent-
ly following the northward pathway in the eastern Med-
iterranean Sea judging from previously reported records
(Goren et al. 2010, Bariche and Azzurro 2012, Rothman
et al. 2013).

The common size of Cheilodipterus novemstriatus is 2
to 6 cm, however, it can reach up to 8 cm TL (Randall 1995,
Gon and Randall 2003, Froese and Pauly 2014). The length
of the two specimens measured in this study was respec-
tively 29.98 and 34.33 mm (standard length) and 40.78 and
46.75 mm (total length). All measurements and counts of
those specimens of C. novemstriatus are given in Table 1.

Cheilodipterus novemstriatus preys on zooplankton
and is commonly found in shallow waters of depths rang-
ing from 1 to 10 m, in association with holes and under
ledge of corals and rocky reefs (Randall 1995). It is widely
distributed throughout the western Indian Ocean, from the
Red Sea, through Gulf of Oman to the Persian Gulf (Froese
and Pauly 2014). Dense populations on rocky substrate at
depths down to 50 m were sighted in Israel (Brokovitch et
al. 2008). In the presently reported study, underwater obser-
vation (Fig. 2) suggested that there is also dense population
of C. novemstriatus in Çevlik coast, indicating rapid expan-
sion of this species in the Turkish coastal waters.

In the last decade, three cardinal fish species rapidly
spread and established along the Turkish coasts (Ergüden
et al. 2013), and several studies reported a range expan-
sion to westwards, along the north-eastern Mediterranean
and Aegean Sea coast of Turkey (Gökoğlu et al. 2011a,
2011b, 2012, Filiz et al. 2012). The increase in water temper-
ature has been considered as the main reason for the
increasing introductions of tropical fish in the Mediterra-
nean Sea (Galil 2009, Ben Rais Lasram et al. 2010, Golani
2010, Turan 2010, Öztürk and Turan 2014).

The immigration of Red Sea fish species from the Suez
Channel is an ongoing process and it continuously affects
and changing the local fish community (Golani 1998,
Turan 2010). Cheilodipterus novemstriatus will prob-
ably be well established like other cardinal fish species
in the Iskenderun Bay and along the Mediterranean coast
of Turkey in the near future. The Red Sea migrants are
continuously changing the fish communities in the east-
ern Mediterranean Sea. Therefore, the role of this newly
established species within the coastal ecosystem, and its
effect on local populations should be investigated.

ACKNOWLEDGMENTS

Our thanks are due to Ahmet Dönmez for his help in
providing this specimens.

REFERENCES

Bariche M., Azzurro E. 2012. New records and estab-
lishment of the Indian Ocean twospot cardinalfish
Cheilodipterus novemstriatus (Rüppell, 1838) in the
Mediterranean Sea. BioInvasions Records 1 (4):
299–301.
DOI: 10.3391/bir.2012.1.4.10
Bariche M., Letourneur Y., Harmelin-Vivien M. 2004.
Temporal fluctuations and settlement patterns of native
and Lessepsian herbivorous fishes on the Lebanese
coast (eastern Mediterranean). Environmental Biology
of Fishes 70 (1): 81–90.
DOI: 10.1023/B:EBFI.0000022928.15148.75

Table 1

| Character                          | Value [mm] | Value [% TL] | Value [% HL] | Count |
|-----------------------------------|------------|--------------|--------------|-------|
| Total length (TL)                 | 46.7–40.8  |              |              |       |
| Standard length (SL)              |            | 34.3–30.0    |              |       |
| Body depth (BD)                   |            | 21.2–19.6    |              |       |
| Head length (HL)                  |            | 20.5–19.8    |              |       |
| Eye diameter (ED)                 |            |              | 46.1–46.0    |       |
| Interorbital width (IOW)          |            |              | 38.2–38.1    |       |
| Length of dorsal fin basis        | 12.4–8.9   |              |              |       |
| Length of second dorsal fin basis | 14.0–11.8  |              |              |       |
| Length of anal fin basis          | 17.2–9.7   |              |              |       |
| Longest pectoral fin ray          | 18.4–14.7  |              |              |       |
| Longest pelvic fin ray            | 17.9–16.2  |              |              |       |
| No. of rays in first dorsal fin (D1)| 7–6        |              |              |       |
| No. of rays in second dorsal fin (D2)| 19–19     |              |              |       |
| No. of rays in anal fin (A)       | II 8–II 8  |              |              |       |
| No. of rays in pectoral fin (P)   | 12–12      |              |              |       |
