



## On the Occurrence of Juvenile *Thunnus thynnus* in the Bay of Izmir, Aegean Sea, Turkey

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### Abstract

Two specimens of juvenile *Thunnus thynnus* (Linnaeus, 1758) were caught off Urla coast in Izmir Bay, Aegean Sea by a commercial gillnet at the depth of 8 m. These juvenile tuna fishes are observed for the first time in Izmir Bay, even if the larger individuals are well-known in the area.

**Keywords:** *Thunnus thynnus*, juvenile, dispersion, occurrence.

### İzmir Körfezi'nde (Ege Denizi, Türkiye) Jüvenil *Thunnus thynnus*'un Bulunuşu Üzerine

#### Özet

Jüvenil *Thunnus thynnus* (Linnaeus, 1758)'un iki bireyi İzmir Körfezi Urla açıklarında (Ege Denizi) ticari bir solungaç ağıyla 8 m derinlikten yakalanmıştır. Bu jüvenil ton balıkları büyük bireyleri bölgede iyi bilinse de İzmir Körfezi'nde ilk kez gözlenmiştir.

**Anahtar Kelimeler:** *Thunnus thynnus*, jüvenil, dağılım, bulunuş.

#### Introduction

Bluefin tuna (BFT), *Thunnus thynnus* (Linnaeus, 1758) is an epipelagic oceanic species that makes long seasonal migrations. They feed on schooling fishes (anchovies, sauries, hakes), squids and crustaceans. Maximum length and weight are 458 cm TL and 684 kg, respectively (Golani *et al.*, 2006; Foese and Pauly, 2016). A 300 kg female produces close to 10 million planktonic eggs in a season (Golani *et al.*, 2006). BFT is an oviparous batch spawner with an inter-spawning interval of 1-2 days, and spawning occurs when sea surface temperature is 22.5-25.5°C between June and August in the Mediterranean Sea (Froese and Pauly, 2016). Juvenile growth is very rapid in the first part of their life, reaching a weight of more than 1 kg in four months, and estimated growth rate is 2-2.37 mm/day (La Mesa *et al.*, 2005).

BFT distributes whole tropical and temperate Atlantic and Pacific Oceans. In the eastern Atlantic: Lofoten Islands off Norway to Canaries, including the Mediterranean and the southern part of the Black Sea (Froese and Pauly, 2016). Black Sea Bluefin tuna has

been well documented since ancient times and there was periodically annual migration from the Black Sea to eastern Mediterranean spawning grounds (Collette *et al.*, 2011), and former fishermen called “anavasya” that migration to the Black Sea; conversely migration also called “katavasya” that migration to the eastern Mediterranean. BFT spreads along the Mediterranean (including Adriatic and Aegean Seas), but it has been invisible both the Sea of Marmara and the Black Sea since end of 1980's due to marine pollution, heavy fishing pressure (Can, 2013), increasing marine traffic in both Istanbul and Çanakkale Straits, etc.

Commercially, BFT is highly esteemed fish and especially famous maze nets are set in Sicily and Sardinia (Mattanza) which drive the fish to “chamber of death” (Golani *et al.*, 2006). Other main fishing methods for catching BFT are purse-seine, pelagic longline and drift gillnets. However, gillnets has been strictly banned since 2002 by both EU member states and the other Contracting Parties to ICCAT (International Commission for the Conservation of Atlantic Tunas). Turkey also adopted the ban in 2011. With increasing the tuna fish farms along the Mediterranean in millennium, wild tuna fish fishery is

increased by purse-seiners even though ICCAT regulated the total allowable catch. However, catch quota, specified by ICCAT dramatically decreases year by year during the last decade.

Data on juvenile BFT catches from the Mediterranean were also unavailable for many years (Collette *et al.*, 2011). *T. thynnus* species has become rare owing to massive overfishing and included IUCN red list as an endangered (EN) species (Collette *et al.*, 2011).

The presence of juvenile fishes in an area indicates both its nursery ground and abundance of its food (the main foods of BFT such as anchovy and sardine are plentiful in Izmir Bay). Additionally, an area such as Izmir Bay, preferred by juvenile fish for its early lifecycle must be unpolluted and sheltered (Cihangir *et al.*, 2001). It seems that Izmir Bay is the favorable ecological zone for BFT. Thus, this paper provides a new juvenile BFT record from a certain area as well as the first reporting for Izmir Bay fish fauna.

## Materials and Methods

On 17 November 2014, two specimens of juvenile *Thunnus thynnus* (Figure 1) were caught by a commercial gillnet (stretched mesh size 72 mm) in the coast of Urla, Izmir Bay (38°22'07''N–26°49'28''E) at the depth of 8 m on a sandy bottom. Both specimens were preserved in 10% buffered formalin and deposited in the Ichthyological Collection of the Ege University, Fisheries Faculty, under catalog number ESFM-PIS/2014-013.

## Results

The length of the fishes sampled were 443 mm and 460 mm FL and diagnostic characteristics were shown in Table 1. Selected body proportions: head length (HL) 27.2-27.3%, pre-dorsal length 30.9-32.2%, pre-anal length 64.3-64.8%, pre-pectoral length 28.2-28.3%, maximum body depth 25.3-



**Figure 1.** Two specimens of juvenile *Thunnus thynnus*, caught from Izmir Bay, NE Aegean Sea (Photograph: O. Akyol).

**Table 1.** Morphometrics (mm) and meristics of the *Thunnus thynnus* specimens caught from the Bay of Izmir, NE Aegean Sea

Characteristics	n1	n2
Total length (TL)	501	515
Standard length (SL)	421	445
Fork length (FL)	443	460
1 <sup>st</sup> predorsal length	137	148
Preanal length	285	298
Prepectoral length	125	130
Maximal body depth	112	117
Head length (HL)	121	125
Eye diameter	20	20
Preorbital length	36	37
1 <sup>st</sup> Dorsal spines	XIII	XIII
2 <sup>nd</sup> Dorsal fin rays	I+13	I+13
Pectoral fin rays	30	30
Ventral fin rays	I+5	I+5
Anal fin rays	II+12	II+12
Upper finlets	9	9
Lower finlets	8	8
Total body weight (g)	1850	1923

25.4%, all of FL. Eye diameter 16-16.5% and pre-orbital length 29.6-29.8%, all of HL. All measurements, counts, and color patterns determined are in accordance with the descriptions of Collette (1986), Golani *et al.* (2006), Ticina *et al.* (2011) and Froese and Pauly (2016).

## Discussion

In this ichthyologic note, finding a pair of juvenile BFT is the first phenomenon for Izmir Bay. Neither Geldiay (1969) nor Akyol *et al.* (2011) did not mention the occurrence of BFT within Izmir Bay fish fauna, although adult BFT are well-known from the open waters of the Bay and whole Aegean Sea. These fish must have come for feeding the bay is one important nursery ground with high food availability, while also being a protected area for large scale fisheries.

There are three well-known spawning grounds for BFT in the Mediterranean, south of Sicily (including Malta), southern Thyrrenian Sea and around Balearic Islands. In 2003, the first evidence of new BFT spawning area found Levantine Basin between Southern Turkey and Cyprus (Karakulak *et al.*, 2004). Shortly after, some BFT larvae have been found between Turkey and Northern Cyprus, including Mersin Bay in the eastern Mediterranean Sea (Oray *et al.*, 2005), and the researchers sampled abundantly 5-7 mm (average: 5.78±1.2 mm) larvae (n=121) during the survey of TUNALEV project in 5-18 June 2004. Eight years after, another larval cruise was conducted during 20-24 June 2012 along the same area and a total of 38 BFT larvae with a mean length of 6.9±1.5 mm were identified (Puncher *et al.*, 2015).

Eggs and larvae of Scombrids in the Aegean Sea, of which four *Auxis rochei*, *Euthynnus alletteratus*, *Thunnus alalunga* and *Xiphias gladius* have been identified from 1992 to 1994 (Vassilopoulou *et al.*, 2008). Additionally, during the Oceana-MarViva campaign conducted late in the spawning season, there is not any BFT larva found in the Aegean Sea, though there are some larvae (n=23) of *Thunnus alalunga* (Oceana-MarViva, 2008). Moreover, eggs and larvae of BFT were not mentioned inside of ichthyoplankton of Izmir Bay between 1974 and 2005 (Çoker and Mater, 2006). It is obviously that the eggs and larvae of BFT have not been observed in the Aegean Sea up to now.

La Mesa *et al.* (2005) determined that the estimated growth rate of juvenile BFT was 2-2.37 mm/day in Italian waters. In the study, the length-at-age of both specimens of BFT must be about 190-230 days, namely 6 or 7 months. It is understood that these fish might be from the "June cohort" in the area. Thus, some part of juvenile BFT from eastern Mediterranean migrates towards to west and northern Aegean Sea. This is a relatively long journey exceeding 1100 km from the reproduction area,

provided there is no other breeding ground closer by in the Aegean Sea. This ichthyologic note presents the first occurrence of juvenile BFT from Izmir Bay. The further studies on ichthyoplankton, moreover, monitoring of juveniles and adults should be done along the Aegean Sea in order to protect the new generations of BFT as an EN fish.

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