

SHORT COMMUNICATION

Additional record of the tripletail fish *Lobotes surinamensis* (Bloch, 1790) in the northern Tunisian deep waters (central south Mediterranean)

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Abstract

The present study reports the capture and recording of an individual of the tripletail fish *Lobotes surinamensis* in Esquerquis Bank (northern Tunisia) in February 2017. In Tunisia, it is the first record of the Herculean species in northern deep waters (around 200 meters) after the latest observation of *L. surinamensis* in 2015 from the coastal water. These reports of the Herculean species, chronologically closer together, lead us to believe that the species was established in the Tunisian waters.

Keywords: Non-indigenous species, *Lobotes surinamensis*, central Mediterranean, Tunisia

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The Atlantic invasive fish *Lobotes surinamensis* (Bloch 1790) is a cosmopolitan marine fish and also Herculean Atlantic migratory species (Deidunet *al.* 2010; Dulčić and Dragičević 2011; Dulčić *et al.* 2014a, b; Froese and Pauly 2018). This species is native to the tropical and subtropical waters of whole oceans. It is a benthopelagic and oceanodromous species with affinity for brackish and shallow water ecosystems (Ounifi-Ben Amor *et al.* 2016a).

In the Indo-Pacific Ocean, its distribution extends from East Africa through all countries of Southeast Asia to Taiwan and southern Japan, northern Australia to southern Queensland, New Guinea to New Britain, and south to Fiji. In the western Atlantic its distribution extends from New England and Bermuda southward to Argentina and Falkland Islands. In the eastern Atlantic, the tripletail fish is found mainly in the Macaronesian region from Madeira, Canary Islands to the Straits of Gibraltar. The species was also observed from Angola to

the Gulf of Guinea and as far as Cape Verde Islands (Froese and Pauly 2018). In the Mediterranean, it was observed more and more frequently mainly in the central region, in the Adriatic and the Aegean Seas (Deidun *et al.* 2010; Dulčić *et al.* 2014a, b; Gökçen *et al.* 2016). Indeed, since the second half of the 20th century, the species has been observed in whole Mediterranean parts and more and more in the eastern basin mainly at the northern Aegean Sea on the Greek and Turkish coasts (Akyol and Kara 2012; Gökçen *et al.* 2016).

The species was reported since the 1990s in several parts of the central basin such as the Maltese islands and the Italian coast (Tortonese 1975; Zava *et al.* 2007; Deidun *et al.* 2010) The presence of *L. surinamensis* in areas such as eastern Algeria, Tunisia and Libya remains sporadic and more rare (Bradai 2000; Hemida *et al.* 2003; Ounifi-Ben Amor *et al.* 2016a).

Additionally, Ounifi-Ben Amor *et al.* (2016a) recorded an unusual presence of the tripletail in shallows waters (two immature specimens of both sexes were caught in 2015, in Southern Lake of Tunis), while the first record of the species was reported in December 1999 in Sfax by Bradai (2000) from the Gulf of Gabes (Southern central Mediterranean).

Sampling

In February 2017, an adult individual of *L. surinamensis* was captured. The specimen was caught by a local fisherman of Sidi Daoud region situated in the north-eastern coast (Cap Bon region). The fisherman was using a trammel net (mesh size: 35-40 mm) to catch pelagic fish in offshore deep water (200 meters depth) for striped tuna (bonito), bluefin tuna and mackerels (mainly Atlantic mackerel). The specimen of *L. surinamensis* was caught in the region of Esquerquis Bank (37°45'0"N, 10°45'0"E), 45 nautical miles north-east of Bizerte region. The fish was photographed *in situ* when it was landed on port. The tripletail fish was identified based on key morphological features and the latest record of the species in Tunisia (Bradai 2000; Bradai *et al.* 2004; Dulčić *et al.* 2014b; Ounifi-Ben Amor *et al.* 2016a).

Morphological diagnosis

As previously stated, *L. surinamensis* was not brought back to the port, but it was photographed and morphometric measurements were taken to the nearest millimetre. Meristic counts were made following Hemida *et al.* (2003). Total length was 46.6 cm, total width was 17.4 cm, while total body weight was estimated as approximately 2.4 kg.

The specimen (Figure 2) was identified and confirmed later and by the description found in Ounifi-Ben Amor *et al.* (2016a). Description, morpho-anatomic details, morphometric measurements and color were in total accordance with Fischer *et al.* (1981), Roux (1986), Hemida *et al.* (2003), Kharin *et al.* (2009), Dulcic and Dragicevic (2011) and Dulcic *et al.* (2014a,b).

Therefore, it was confirmed that the identification of the specimen was *L. surinamensis*.

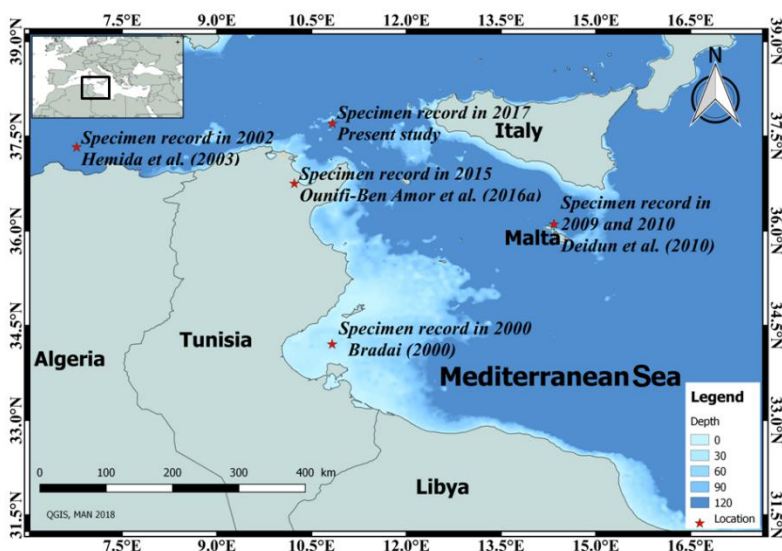


Figure 1. Records of *Lobtes surinamensis* in Tunisian waters and the central Mediterranean since 2000



Figure 2. Adult specimen of *Lobtes surinamensis* collected in the northern Tunisian coast and photographed by the fisherman in the port of Sidi Daoud (Cap Bon region, north-east Tunisia)

The observation of the fish in marine environment such as the Esquerquis Bank can be related to the trophic needs of the species. Indeed, *L. surinamensis* feeds on small crustacean species (Franks *et al.* 2003), mainly spheromatids and amphipods (Ounifi-Ben Amor *et al.* 2016a) which are more abundant on the

productive marine ecosystems around islands, islets and banks. In such ecosystems, *L. surinamensis* finds a favorable ecobiological environment and its adequate ecotrophic patterns (Mejri *et al.* 2004; Ben Souissi *et al.* 2004, 2005; Ben Amor *et al.* 2009; Ounifi-Ben Amor *et al.* 2016b). Finally, rocky and productive ecosystems offer an adequate habitat to species sedentism. According to Tortonese (1975), *L. surinamensis* poses camouflage behavior against predators in such a habitat.

Since its first record in the Sicilian waters (Doderlein 1875), *L. surinamensis* is considered as a Herculean migrant (*sensu* Quignard and Tomasini 2000). The species was then recorded in Italy (Bini 1968; Zava *et al.* 2007), Spain (Palom 1991), in the Maltese islands (Deidun *et al.* 2010) and in the Aegean Sea (Minos and Economidis 2007; Minos and Economidis 2015; Akyol and Kara 2012); Gökçen *et al.* 2016).

L. surinamensis was also caught in the Adriatic Sea (Dulcic and Dragicjevic 2011; Dulcic *et al.* 2014a, b; Gökçen *et al.* 2016), the northernmost record of this species in the Mediterranean. The southernmost Mediterranean records were reported by Bradai *et al.* (2004) in the Gulf of Gabes, and in 2009 in Alexandria waters (Akeland Philips 2014). Our finding (present record) constitutes the northernmost record of the *L. surinamensis* in Tunisian waters. The westernmost occurrence for the central Mediterranean region was reported near the Algerian coast in December 2002 by Hemida *et al.* (2003). Thus, together with the older observations of *L. surinamensis* in the coastal Tunisian waters (Bradai 2000; Bradai *et al.* 2004; Ounifi-Ben Amor *et al.* 2016a) and the actual record in offshore northern waters, we think that the species might be well established in the Tunisian waters. The presence of two juveniles for both sexes reported by Ounifi-Ben Amor *et al.* (2016a) in brackish ecosystem waters reinforces this hypothesis.

As Bradai *et al.* (2004) recorded the species in the Gulf of Gabes, further in the east side with warmer waters, it can be assumed that the records' frequency in the northern waters of the Algerian and Tunisian coasts, can be earlier than the latest records. Hence, it can be assumed that the species presence in the Tunisian waters is dated back to the period between 1990 and 2000.

The study of Gökçen *et al.* (2016) revealed observations of *L. surinamensis* in the extreme eastern Mediterranean areas, mainly in the Ionian and Aegean Seas, where water is warmer particularly by the records of Economidis and Bouchot (1976), Gücü and Bingel (1994), and Başusta and Erdem (2000). These observations which have been noted before the 2000's, and previously to the first record species in Tunisian southern waters (Bradai 2000) reinforces our assumption.

Additionally, its recent sighting in a lagoon environment in 2015 (south lake of Tunis, Ounifi-Ben Amor *et al.* 2016a) leads to the same reasoning proposed here if we consider that the transition of a non-native species between a pelagic ecosystem to a coastal lagoon environment requires some time. In the first step, this period corresponds to the species adaptation namely its acclimation with physical setting and basic trophic requirements, and then under its ecological niche in the second step (optimization of its trophic reproduction and growth needs) (Nakazawa *et al.* 2010). We suggest the existing of a sustainable population established in the open sea, near the Tunisian waters. Ounifi Ben Amor *et al.* (2016a) presented a similar vision.

According Gökçen *et al.* (2016), *L. surinamensis* was recorded today on 32 observations over the period from 1968 to 2016. The presence of the species was spread over the two Mediterranean basins, with more abundance in the central Mediterranean, the Adriatic and the Aegean Sea. The hypothesis of Hemida *et al.* (2003) about a progressive invasion of the tripletail on the Mediterranean, from the eastern Atlantic remains strongest. The study of Gökçen *et al.* (2016) confirms historically this invasion of *L. surinamensis* during about half a century of species observations in the Mediterranean Sea.

Nevertheless, as opposed to several other authors who considered only the warming Mediterranean waters and the introduction of lessepsian species (Francour *et al.* 1994; Ben Rais Lasram and Mouillot 2009), we recall the existence of cooling water phenomena (induced by cold and dry winds, and the evaporation of surface water, especially during the hibernal period), in rather special areas in the Mediterranean, particularly in the north-occidental Mediterranean Sea (Estournel *et al.* 2016), central (Tyrrhenian and Ionian region) and oriental-levantine regions (Ouba 2015). These areas represent a corridor and/or a “hydrodynamic islands” to the presence and the establishment of the allochthonous Herculean species in the Mediterranean Sea (Ouba 2015).

Carpenter and Robertson (2015) also considered that the species is widely distributed and has successfully established in the Mediterranean. Some authors as Fabio Fiorentino (*pers.com*, April 2018), considered that *L. surninamesis* as cosmopolitan and circa Mediterranean species, than an alien species regarding its actual presence in the Mediterranean especially in southern Italians waters. Additionally, Carpenter and Robertson (2015) and F. Fiorentino (*pers.com*, April 2018) noted that *L. surinamensis* has become popular in recreational fishing.

Moreover, Mediterranean regions where major observations of the species are located (central Mediterranean, Adriatic and Ionian-Aegean Seas) (Gökçen *et al.* 2016) seem more suitable for the establishment *L. surinamensis* especially in terms of temperature, currents, bottom nature and bathymetry.

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