A review on maximum length of the greater weever *Trachinus draco* Linnaeus 1758 (Perciformes: Trachinidae) with a new maximum length from Oran Bay (Western Algeria)

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ABSTRACT

On the 15th April 2017, one female specimen of the greater weever, *Trachinus draco* measuring 44.69 cm in total length and weighting 885 g was captured by trammel net in Oran Bay (Cape Rousseau) at 120 m depth. Up to date, this length is a new record of maximum length reached for this trachinidae for Algerian waters and the second maximum length recorded in Mediterranean basin according to Fischer *et al.*, 1987 observation noted at 45 cm.

Keywords: The greater weever, *Trachinus draco*, Maximum size, Oran Bay, Mediterranean Sea

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Introduction

The greater weever is a trachinidae found in Eastern Atlantic; Norway to Morocco, Madeira and Canaries Islands, including the Mediterranean and the Black Sea (Fischer et al., 1987; FishBase: Froese and Pauly, 2020). *Trachinus draco* Linnaeus 1758 inhabits sandy, muddy or gravelly bottoms, from a few meters to about 150 m. Rest on the bottom, often buried with eyes and tip of first dorsal fin exposed (Frimodt, 1995). The first dorsal fin rays, as well as the spine on the pre-operculum contains venomous spines protecting the species from predators. During night, the greater weever leaves the burrow to feed on small invertebrates and fishes (Carpenter et al., 2015). At night, it also swims around freely, even pelagically (Muus and Nielsen 1999). *T. draco* is oviparous, eggs and larval stages are pelagic (Tortonese, 1986). There are dark markings along the scales; the anterior dorsal fin is black and contains venomous spines. Its length is very common between 10 and 30 cm with a maximum of 45 cm in the Mediterranean and common between 15 to 20 cm with a maximum of 36 cm in the Black Sea (Fischer et al., 1987).

Available bibliography for *T. draco* is diversified dealing with reproduction (Bagge, 2004; Ak and Genç, 2013), Parasites (Azizi et al., 2016; Kayiş and Er, 2016), lipid content (Loukas et al., 2010), feeding habits (Santic et al., 2016), population structure and dynamics (Quigley, 1994; Portillo Strempel et al., 2008; Buz and Basusta, 2015; Carpenter et al., 2015; Custovic et al., 2014) but most of them focused on envenomation and toxin properties (Muir evans 1907; Skeie, 1962; Chahl and Kirk, 1975; Perriere and Michel, 1986; Halstead and Vinci, 1987; Chhatwal and Dreyer, 1992; Bourre and Lançon, 2002; Church and Hodgson, 2002; Acçiaro et al., 2003; Verdiglione et al., 2003; Berger and Caumes, 2004; Russell and Emery, 2006; Lopacinski et al., 2009; Benlier et al., 2010; Portillo Strempel and Ceballos, 2012) and mainly on weight length relationship (Dorel 1986; Coull et al., 1989; Gonçalves et al., 1997; Merella et al., 1997; Moutopoulos and Stergiou, 2002; Mendes et al., 2004; Mendes et al., 2006; Ozaydin et al., 2007; Karakulak et al., 2006; Ikyaz et al., 2008; Mata et al., 2008; Ak et al., 2009; Giacalone et al., 2010; Benmessaud et al., 2015; Öztekin et al., 2016; Özdemir et al., 2017; Hamed et al., 2016).

In fisheries science maximum length and maximum age are important theoretical parameters found as entry data in majority of the models used in stock assessments (Allen, 1971; Pauly, 1980; Welcomme, 1999; Froese and Binohlan, 2000). In this context, updating the maximum size of a species harvested for commercial or recreational purposes is gaining more importance (Borges, 2001; Dulčić and Soldo, 2005; Akyol and Şen, 2008). The maximum observed length is a useful tool for a rapid evaluation of growth rates in the absence of basic data (Legendre and Albaret, 1991, Froese and Binohlan, 2000). To date, for Algerian waters no such studies were leaded on this trachinidae.

Material and Methods

On the 15th April 2017, one female specimen of the greater weever, *Trachinus draco* measuring 44.69 cm in total length and weighting 885 g was captured by trammel net operating in Oran Bay (Cape Rousseau: 35°48'45.0"N 0°36'46.8"W) on sandy/rocky bottom at 120 m depth (Fig. 1).

![Figure 1. Sampling location of greater weever (Trachinus draco) specimen.](image)

The specimen was measured with an electronic caliper to 0.1 mm precision and weighted to the nearest 0.1 g then photographed. Eighteen morphometric characteristics were measured (Figure 2): Total length (TL), Fork length (FL), Standard length (SL), Pectoral fin length (LP), Ventral fin length (LV), 1st dorsal fin length (LD1), 2nd dorsal fin length (LD2), Cephalic length (LC), Maxillary length (LM), Post-orbital distance (POD1), Eye diameter (O), Post-orbital distance (POD2), 1st dorsal fin length (LD1), 2nd dorsal fin length (LD2), Cephalic length (LC), Maxillary length (LM), Post-orbital distance (POD1), Eye diameter (O), Post-orbital distance (POD2), Pre-ventral fin distance (PVD1), Post-ventral fin distance (PVD2), Anal fin length (LA), Post-anal fin distance (PAD), Caudal peduncle minimal depth (T), Maximum body height (TPC), Total weight (TW). Description, measurements and percentage of each body part are reported to total length are given in (Table 1).
Total length (TL), Fork length (FL), Standard length (SL), Pectoral fin length (LP), Ventral fin length (LV), Cephalic length (LC), Maxillary length (LM), Pre-orbital distance (POD1), 1st Dorsal fin length (LD1), 2nd Dorsal fin length (LD2), Eye diameter (O), Post-orbital distance (POD2), Anal fin length (LA), Caudal peduncle minimal depth (T), Maximum body height (TPC), Pre-ventral fin distance (PVD1), Post-anal fin distance (PAD), Post ventral fin distance (PVD2).

Figure 2. Morphometric measurements of the greater weever *Trachinus draco* adapted from Fischer *et al.* (1987).

**Results and Discussion**

On the 15th April 2017, one female specimen of the greater weever, *Trachinus draco* measuring 44.69 cm in total length and weighting 885 g was captured by trawler operating in Oran Bay at 120 m depth. Species identification sheets (Fischer *et al.*, 1987; Djabali *et al.*, 1993) were used to identify the specimen of *T. draco* (Fig.3) where the body appear elongated and compressed. Small eyes located near the dorsal profile of the head; width of the interorbital space roughly equal to half the diameter of the eye; large oblique mouth, the maxillary extending beyond the posterior edge of the eye when the mouth is closed with villiform teeth.

According to Fischer *et al.*, (1987) *T. draco* has a strong venemous spine on the operculum, 2 spines on the anterodorsal edge of the orbit and another above the upper lip, in front of the eye. Two dorsal fins, the first short counting 5 to 7 spines, the second, long counting 29 to 32 soft rays; anal with 2 spines and 29 to 32 soft rays. Generally, the greater weever is greenish brown back with dark spots on the head, yellowish-white flanks according to the oblique rows of scales, of brown, blue, yellow lines; second dorsal fin yellowish, anal mauve.

Figure 3. *Trachinus draco* (44.69 cm TL ♀) caught in Oran Bay, (Photographed by: ADDA NEGGAZ Hichem).
Measurements, meristic characteristics, weight and percentage of each body part of the greater weever caught in Oran Bay reported to total length are given in (Table 1).

**Table 1.** Morphometric measurements as percentage of total length (% TL) of *Trachinus draco* caught in Oran Bay (W. Mediterranean Sea).

| Morphometric characteristics | Measurement Proportion (cm) Proportion (%) |
|-----------------------------|------------------------------------------|
| Total length (TL)           | 44.69                                    | 100.00 |
| Fork length (FL)            | 43.44                                    | 97.20  |
| Standard length (SL)        | 39.30                                    | 87.94  |
| Pectoral fin length (LP)    | 5.76                                     | 12.90  |
| Ventral fin length (LV)     | 3.28                                     | 7.360  |
| 1st dorsal fin length (LD1) | 2.74                                     | 6.140  |
| 2nd dorsal fin length (LD2) | 19.76                                    | 44.22  |
| Cephalic length (LC)        | 7.67                                     | 17.16  |
| Maxillary length (LM)       | 1.41                                     | 3.160  |
| Post-orbital distance (POD1)| 2.96                                     | 6.620  |
| Eye diameter (O)            | 0.77                                     | 1.720  |
| Post-orbital distance (POD2)| 5.68                                     | 12.72  |
| Pre-ventral fin distance (PVD1)| 6.15                                              | 13.78  |
| Post-ventral fin distance (PVD2)| 2.70                                           | 6.060  |
| Anal fin length (LA)        | 25.70                                    | 57.51  |
| Post-anal fin distance (PAD)| 2.66                                     | 5.950  |
| Maximum body height (TPC)   | 2.57                                     | 5.750  |
| Caudal peduncle minimal depth (T)| 8.40                                                | 18.80  |
| Total weight (TW)           | 0.88                                     | -      |

**Meristic characteristics**

| Meristic characteristics | Operculum spines | Short eye spines | 1st dorsal fin spines | 2nd dorsal fin | Pelvic fin | Pectoral fins | Anal fin | Caudal fin |
|-------------------------|------------------|------------------|-----------------------|----------------|------------|---------------|----------|-----------|
|                         | 2*               | 2                | 7 (2*+5)              | 32             | 6          | 15            | 31       | 16        |

*: venomous

According to Portillo Strempel et al., 2008 *T. draco* showed a seasonal migratory behavior, with a preference for shallower waters, up to 75 m depth during autumn and for deeper waters up to 160 m depth, during spring in the northern Alboran Sea (SW Mediterranean) which is the case of our specimen captured in April 2017.

The maximum length ever recorded of *T. draco* belongs to IGFA 2001 in the Atlantic Ocean (Canary island, 56cm) and by Otel (2007) in Danube Delta (53cm) followed by Fischer et al., 1987 (45cm) in the Mediterranean, all successive records are shown in Table 2.

Greater Weever is caught as bycatch in the majority of fisheries and landings are declared from the following FAO regions: Northeast Atlantic, Mediterranean and Black Sea. The overall trend in landings is one of dramatic fluctuations with a general increase in landings over time (Carpenter et al., 2015). As stated previously little is known on its ecobiology, population trends and most of studies focused on its toxins.

In the Mediterranean Sea, the maximum length of *T. draco* were reported as 45 cm TL (n=1124); 36 cm from Black Sea (Fischer et al.,1987); If we consider to maximum length recorded during our study so this length represents the maximum length for both Algerian and Western Mediterranean Sea. The aim of this paper is to present a compilation of maximum length for *T. draco* with a new record for the greater weever caught in Western Mediterranean Sea (Oran Bay).

Wootton 1990; 1999 in Helfman et al. (2009) stated that factors such as temperature, food availability, nutrient availability, light regime, oxygen, salinity, pollutants, current speed, predator density, intraspecific social interactions, and genetics often working in combination, creating large variations in size of fishes of the same and different ages, also populations exposed to high fishing mortality/pressure will respond by reproducing at smaller average sizes and ages. Generally, in the Mediterranean and Black Sea where fishing activity is intensive, the maximum length was relatively low (Table 2) 32 cm in Tunisian waters, 38cm in French waters, 32.9 in Greek waters, 23 cm in Egyptian waters cm TL.

Contrarily, in oceanic and northern seawaters individuals doesn’t face the same fishing pressure, maximum length appears more important with a maximal length recorded in Canary Islands reaching 56 cm (IGFA, 2001). In this context, frequenting the eastern part of oranian shoreline an area undergoing a less fishing pressure than the western area (Oran Bay) (Pers.obs) we can explain that our specimen may have reached this maximum length observed. Also, we can add the fact that there is no predator known for *T. draco* at the top of the trophic chain.
Table 2. Maximum length records of *Trachinus draco* given by several authors.

| Location                        | Depth (m) | TL (cm) | TW (g) | References                           |
|---------------------------------|-----------|---------|--------|--------------------------------------|
| **Turkey**                      |           |         |        |                                      |
| Aegean Sea                      | <30       | 35.2    | 235.82*| Karakulak *et al.*, (2006)           |
| Saros Bay                       | 28-370    | 37.0    | 427.00 | Ismen *et al.*, (2007)               |
| Izmir Bay                       |           | 34.1    | 288.99*| Ozzydin *et al.*, (2007)             |
| N. Eastern Mediterranean        | 5-100     | 20.0    | 53.18  | Sangun *et al.*, (2007)              |
| Aegean Sea                      | 30-70     | 36.6    | 365.42*| Ilkyay *et al.*, (2008)              |
| Aegean Sea                      |           | 36.6    | 401.43 | Kmaecigil *et al.*, (2008)           |
| Eastern Black Sea               | 60        | 35.0    | 549.20 | Ak *et al.*, (2009)                  |
| İskenderun Bay                  | 18-19m    | 20.6    | 55.84  | Gökçe *et al.*, (2010)              |
| Eastern Black Sea               | 60        | 25.8    | 131.76 | Ak and Genç, (2013)                 |
| İskenderun Bay                  |           | 28.7    | 145.21 | Buz and Basusta, (2015)             |
| Aegean Sea                      | 0-400     | 36.4    | 294.00 | Öztekin *et al.*, (2016)            |
| Black Sea                       |           | 40      | -      | Bănărescu, (1964)                   |
| Romania                         |           |         |        |                                      |
| Agigea Eforie Nord Area         | 9.3-12.5  | 16.5    | 18-27  | Roșca *et al.*, (2010)              |
| Danube Delta                    | -         | 53.0    | -      | Otel, (2007)                        |
| Tunisia                         |           |         |        |                                      |
| Gulf of Tunis                   |           | 32.0    | 236.30 | Hamed and Chakroun-Marzouk, (2016)   |
| France                          |           |         |        |                                      |
| Gulf of Gascogne                |           | 38.5    | 317.97*| Dorel, (1986)                       |
| Catalon coast                   | 1-80      | 38.5    | 375.00 | Crec’hriou *et al.*, (2012)         |
| Greece                          |           |         |        |                                      |
| Cyclades, Aegean Sea            | 4-90      | 32.5    | 249.03*| Erzini *et al.*, (1999)              |
| Greece                          |           | 32.0    | 219.03*| Moutopoulos and Stergiou, (2002)     |
| Greece, Thermaikos Gulf         |           | 30.5    | 189.37*| Karachle and Stergiou, (2008)       |
| Greece North Aegean Sea         | 15-800    | 28.8    | 149.40 | Torres *et al.*, (2012)             |
| Korinthiakos Gulf               | 50-300    | 32.9    | 206.13*| Moutopoulos *et al.*, (2013)        |
| Spain                           |           |         |        |                                      |
| Balearic Islands                | 0.5-1713  | 26.5    | 125.00 | Morey *et al.*, (2003)              |
| Eastern Atlantic                | <20       | 29.5    | 167.94*| Mata *et al.*, (2008)               |
| Alboan Sea                      | 50-164    | 39.0    | -      | Portillo Strempel *et al.*, (2008)  |
| Portugal                        |           |         |        |                                      |
| Eastern Atlantic Ocean          | 13-55     | 34.0    | 502.06*| Gonçalves *et al.*, (1997)           |
| Algarve coast                   |           | 39.6    | 554.10 | Santos *et al.*, (2002)             |
| Eastern Atlantic                | 30-350    | 39.0    | 460.00 | Mendes *et al.*, (2004)             |
| Egypt                           |           |         |        |                                      |
| Alexandria Bay                  | 30-200    | 23.0    | 200.52*| Abdallah *et al.*, (2002)           |
| Croatia                         |           | 26.8    | 330.00 | Dulčić and Kraljević, (1996)        |
| Italy                           |           |         |        |                                      |
| Sicily                          | 10-200    | 29.5    | 169.26*| Giacalone *et al.*, (2010)          |
| Ireland                         |           |         |        |                                      |
| Schull Bay                      | -         | 42.0    | 510.00 | Went, (1973)                        |
| Keem Bay (Co Mayo)              | -         | 35.4    | 311.00 | Quigley *et al.*, (1990)            |
| Ballycotton Bay (Co Mayo)       | -         | 38.7    | -      | Quigley *et al.*, (1994)            |
| North East Atlantic             |           | 35.0    | 544.00 | Coull *et al.*, (1989)              |
| North Sea/North-East Atlantic   | -         | 36.5    | 352.78*| Wilhelms, (2013)                    |
| Western Atlantic, Canary island | -         | 56.0    | 1740.00| IGFA, (2001)                        |
| Northern/Central Adriatic       | -         | 32.8    | -      | Custovic *et al.*, (2014)           |
| Denmark                         |           | 32.5    | 221.40 | Bagge, (2004)                       |
| Kattegat                        | 9.9-27.1  | 37.6    | 350.20 |                                      |
| Mediterranean Sea               |           | 45.0    | -      | Fischer *et al.*, (1987)            |
| Black Sea                       |           | 36.0    | -      |                                      |
| Algeria                         |           | 120     | 44.69  | 885.00 | Present study                       |

*Weight calculated from LWR (length weight relationship).
Conclusion

As conclusion, more efforts and means must be deployed to explore Oran Bay biodiversity deeply, target large specimens and try to study fish population’s dynamics and their interaction with different biotopes present in the area (sandy, muddy, rocky, gravelly).

Compliance with Ethical Standard

Conflict of interests: The authors declare that for this article they have no actual, potential or perceived conflict of interests.

Ethics committee approval: Ethics committee approval is not required for this study.

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