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New Fisheries-related data from the Mediterranean Sea (April 2015)

KARACHLE P.K. — Institute of Marine Biological Resources & Inland Waters, Hellenic Centre for Marine Research, 46.7 km Athens Sounio Avenue, P.O. Box 712, 19013 Anavyssos Attiki

BAŞUSTA A. — Fisheries Faculty, Firat University, TR-23119, Elazig

BAŞUSTA N. — Fisheries Faculty, Firat University, TR-23119, Elazig

BOSTANCI D. — Faculty of Science and Arts, Ordu University, Ordu 52200

BUZ K. — Fisheries Faculty, Firat University, TR-23119, Elazig

GIRGIN H. — Fisheries Faculty, Firat University, TR-23119, Elazig

CHATER I. — Laboratory of Animal Biology, Science University of Tunis, 2092 Tunis, El Manar

KOKOKIRIS L. — Alexander Technological Educational Institute of Thessaloniki, Department of Aquaculture & Fisheries Technology, P.O. Box: 157, GR-63200, Nea Moudania

KONTAŞ S. — Fatsa Faculty of Marine Sciences, Ordu University, Ordu 52400

KTARI M.-H. — Laboratory of Animal Biology, Science University of Tunis, 2092 Tunis, El Manar

MARAVELIAS C.D. — Institute of Marine Biological Resources & Inland Waters, Hellenic Centre for Marine Research, 46.7 km Athens Sounio Avenue, P.O. Box 712, 19013 Anavyssos Attiki

MINOS G. — Alexander Technological Educational Institute of Thessaloniki, Department of Aquaculture & Fisheries Technology, P.O. Box: 157,

GR-63200, Nea Moudania
OZER E.I. Fisheries Faculty, Firat University, TR-23119, Elazig
ROMDHANI A. Laboratory of Animal Biology, Science University of Tunis, 2092 Tunis, El Manar
TIRALONGO F. Ente Fauna Marina Mediterranea – Avola (SR), 96012
TIBULLO D. Ente Fauna Marina Mediterranea – Avola (SR), 96012
TSERPES G. Institute of Marine Biological Resources and Inland Waters, Hellenic Centre for Marine Research, P.O. Box 2214, 71003 Heraklion
VASILAKOPOULOS P. Hellenic Centre for Marine Research, P.O. Box 712, 19013, Anavyssos
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Collective Article B

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New Fisheries-related data from the Mediterranean Sea (April 2015)

P.K. KARACHLE[1], A. BAŞUSTA[2], N. BAŞUSTA[2], D. BOSTANCI[3], K. BUZ[2], H. GIRGIN[2], I. CHATER[4], L. KOKOKIRIS[5], S. KONTAŞ[6], M.-H. KTARI[4], C.D. MARAVELIAS[1], G. MINOS[5], E.I. OZER[2], A. ROMDHANI[4], F. TIRALONGO[7], D. TIBULLO[7], G. TSERPES[8] and P. VASILAKOPOULOS[1]

[1] Hellenic Centre for Marine Research, P.O. Box 712, 19013, Anavyssos, Hellas
[2] Fisheries Faculty, Firat University, TR-23119, Elazig, Turkey
[3] Faculty of Science and Arts, Ordu University, Ordu 52200, Turkey
[4] Laboratory of Animal Biology, Science University of Tunis, 2092 Tunis, El Manar, Tunisia
[5] Alexander Technological Educational Institute of Thessaloniki, Department of Aquaculture & Fisheries Technology, P.O. Box: 157, 63200, Nea Moudania, Hellas
[6] FatsaFaculty of Marine Sciences, Ordu University, Ordu 52400, Turkey
[7] Ente Fauna Marina Mediterranea – Avola (SR), 96012, Italy
[8] Hellenic Centre for Marine Research, P.O. Box 2214, 71003 Heraklion, Hellas

Abstract

In this second Collective Article with fisheries-related data from the Mediterranean Sea we present the evaluation of bony structures in aging *Barbus tauricus*, otolith dimensions-body length relationships for two species (*Trachinus draco* and *Synchiropus phaeton*), information on the growth of juvenile *Thunnus thynnus* and *Ruvettus pretiosus*, weight-length relationships for three species *Aulopus fiamentosus* and *Tylosurus acus imperialis* and data on the feeding habits and reproduction of *Aulopus fiamentosus*.

Keywords: Body length-otolith dimension relationships, bony structures, age, growth, weigh-length relationships, diet.

Introduction

It is widely accepted that biological information, such as weight-length relationships, age, growth, reproduction and feeding, is essential for understanding the ecological role of species in the ecosystem, as well as for management purposes and implementation of fisheries assessment models. In this framework, Mediterranean Marine Science is continuing the recently launched Collection Article, and making available information that is not easily published in high impact factor journals.

Here, we present information on otolith body-length relationships for two species (*Trachinus draco* and Synchiropus phaeton) and an evaluation of bony structures for ageing in the Crimean barbel *Barbus tauricus*. With respect to growth, information is presented regarding juvenile tuna (*Thunnus thynnus*) and oilfish (*Ruvettus pretiosus*), and weight-length relationships for three species (*Aulopus fiamentosus*, *Thunnus thynnus* and *Tylosurus acus imperialis*). Finally, new biological data on the feeding habits and reproduction of *Aulopus filamentosus* is also presented.

1. The relationships between otolith dimensions and total length of the greater weever *Trachinus draco* from the North-eastern Mediterranean, Turkey

By N. Başusta and K. Buz

The greater weever (*Trachinus draco*) is a demersal species inhabiting sandy muddy bottoms, from a few meters to 150 m. It is known to be distributed in the eastern Atlantic from Norway to Morocco, and also the Mediterranean and the Black sea (Golani *et al*., 2006). It has minor commercial value in Turkey. The size and shape of otoliths, which are an important bony structure used for age determination in fishes and size of fish in archaeological samples, is also useful for determining the size of fish if the lengths of otoliths encountered in predator stomachs are measured (Echevería, 1987; Akyol *et al.,* 2004; Başusta *et al*., 2013a).

This study provides the relationships between otolith dimensions (length, breadth, and weight) and total fish length (TL) for the greater weever inhabiting Iskenderun Bay, Turkey. For this purpose, a total of 106 specimens were collected in the Northeastern Mediterranean region from small-scale fisherman, during September 2013-March 2014. Otolith length (OL), breadth (OB) and weight (OW) were measured for each specimen to the nearest 0.001mm and 0.0001g, respectively.

The length, breadth and weight of otoliths were measured from each specimen and were 5.8-10.22 mm 2.94-4.6 mm 0.0228-0.0996 g, respectively. The relation between total length and otolith breadth and length were determined as $y= 0.0317x + 0.4418$ ($R^2 = 0.8221$); $y = 0.0107x + 1.2294$ ($R^2 = 0.7551$), respectively (Fig. 1 A, B). The relationships between otolith length and otolith breadth and total weight and otolith weight were $y=0.2939x+1.414$

(R^2 = 0.6974) and y=0.0005x+0.0052 (R^2 = 0.8929), respectively (Fig. 1 C, D). According to the R^2 values given above, the correlations between otolith dimensions and fish length were found significant (P<0.05).

Finally, these findings are the potential applications in trophic ecology and/or paleontology studies.

2. Otolith dimensions-fish length relationships of the phaeton dragonet (*Synchiropus phaeton)* in Iskenderun Bay

By A. Başusta, E.I. Ozer and H. Girgin

The size and shape of otoliths, which are important bony structures used for age determination in fishes and size of fish in archaeological samples and useful for determining the size of fish if the lengths of otoliths encountered in predator stomachs are estimated (Bostanci *et al*., 2012; Başusta *et al*., 2013b, c). The relationship between fish length and otolith dimensions have not been investigated for this species. This study provides the first information on the otolith biometry-total length relationships of phaeton dragonet (*Synchiropus phaeton)* in Iskenderun Bay.

A total of 270 specimens of phaeton dragonet have been examined (133♀ and 137♂). The otoliths were dried, cleaned, and their dimensions measured from the anterior to the posterior edge of the greatest distance (Başusta *et al*., 2013b, c). Total length was measured to the nearest 1 mm and the weight of each specimen was determined with a digital scale to the nearest 0.01g and then the otoliths of the fish samples were removed. Otolith length (OL), breadth (OB) and weight (OW) were measured for each specimen to the nearest 0.001mm and 0.0001g, respectively (Fig. 2).

The length, breadth and weight of otoliths were 1.28-3.486 mm, 0.512-1.843 mm and 0.0008-0.00552 g, respectively. The relations among total length and otolith breadth and length were y = 0.0641x + 0.3922 (R^2 = 0.76); y = 0.1184x + 1.1954 (R^2 = 0.86), respectively (Fig. 3 A, B). The relationships between otolith length and otolith breadth and total weight and otolith weight were y = 0.4948x – 0.1176 (R^2 = 0.79) and y = 0.0002x + 0.0006 (R^2 = 0.85), respectively (Fig. 3 C, D). The relationship between otolith dimensions and fish length did not present significant differences (P>0.05).

As a result, it is noted that for *S. phaeton,* a positive and strong correlation between otolith size (length, breadth and weight) and total length was observed.

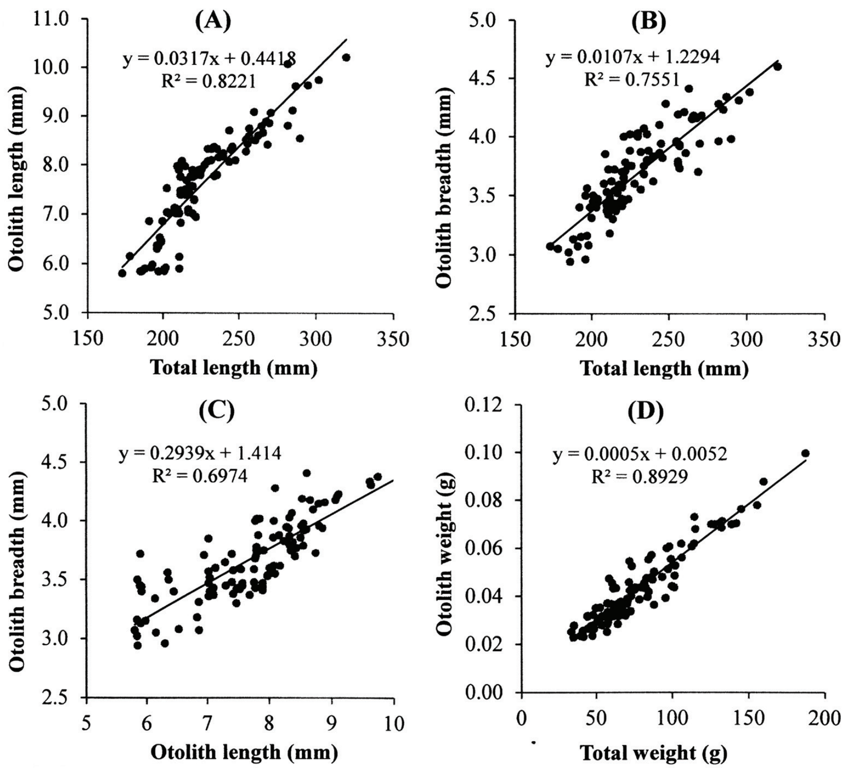

Fig. 1: Total length-Otolith length (A), Total length-Otolith breadth (B), Otolith length-Otolith breadth (C) and Total weight-Otolith weight relationship in *Trachinus draco.*

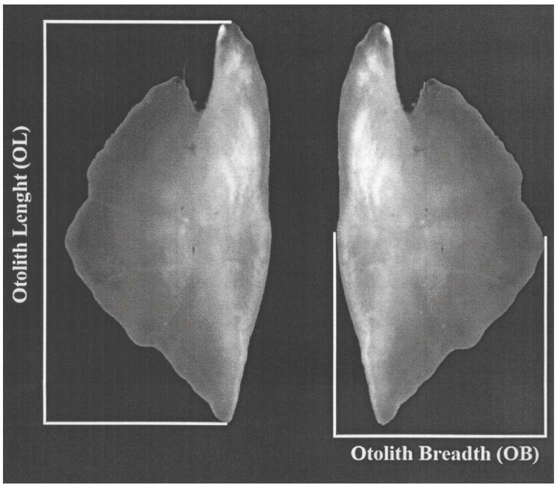

Fig. 2: Otolith measurements of *Synchiropus phaeton (TL=19.4 cm).*

3. Determination of reliable bony structure for ageing and biological data of the Crimean barbel *Barbus tauricus* Kessler, 1877 from Turkey

By S. Kontaş and D. Bostanci

Age determination is an important step in fisheries biology studies. Accurate age can change from one bony structure to another. Consequently, in both growth and population dynamics studies, firstly different structures should be examined and then reliable bony structure should be determined for ageing. The ageing of fishes, and consequently the determination of their growth rate, is an integral component of modern fisheries sciences. Weight-Length (WLRs) and length-length (LLRs) relationships provide useful information for fishery management. They are commonly used for weight estimation from length of individual fish and calculation of condition factors to compare observed and expected length-weight values (Froese, 2006). The aim of the study on the *Barbus tauricus* population was: i) to determine a reliable bony structure for ageing and ii) to estimate some biological data such as length and weight distributions, length-weight relationship, von Bertalanffy growth equation and condition factor.

In this study, different bony structures of a total of 350 *B. tauricus* individuals, caught from the lower Melet River (Turkey) between July 2010 and October 2011, were evaluated for age determination (Kontaş, 2012). Vertebra, scale, asteriscus and lapillus otoliths were evaluated with 3 repetitive readings. The percent agreement (PA%), average

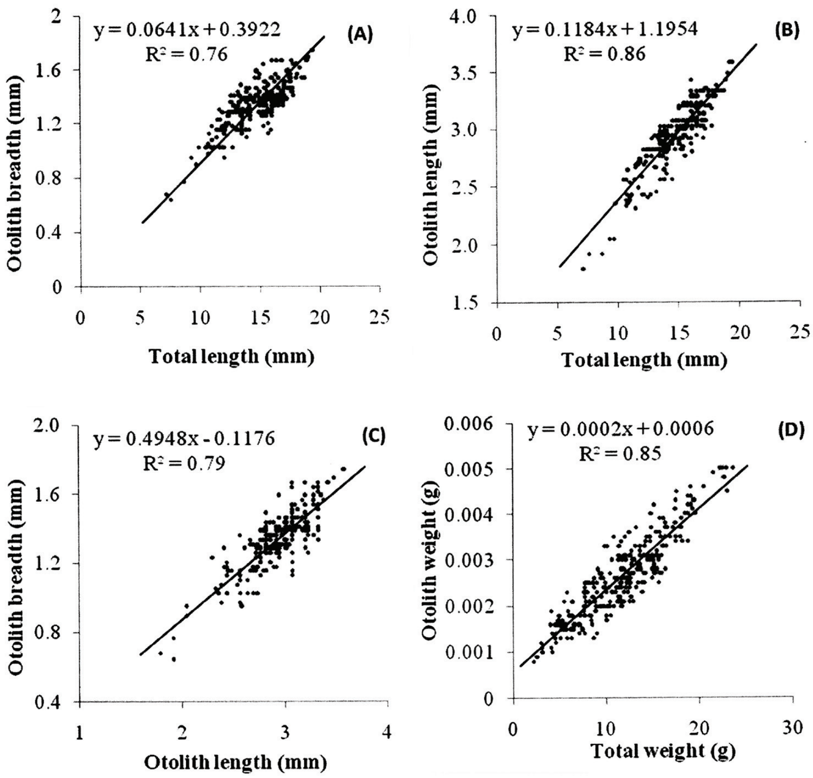

Fig. 3: Total length-Otolith breadth (A), Total length-Otolith length (B), Otolith length-Otolith breadth (C) and Total weight-Otolith weight relationship in *Synchiropus phaeton*.

percent error (APE%) and coefficient of variation (CV%) were used to compare the reliability of bony structures. Age composition and the von Bertalanffy growth equation of the population were examined using the age of the most reliable bony structure. In order to choose reliable bony structure, PA, APE, CV were evaluated together. Vertebra has the highest PA (92%) and the lowest APE (5.14%) and CV (9.74%). Consequently, vertebra was the most reliable bony structure for the lower Melet River population.

Age distributions were between I and V years. The von Bertalanffy growth equation was calculated as $L_t = 25.6\ [1-e^{-0.3339\ (t+0.0204)}]$ in this study. Şahin *et al.* (2007) reported that the equation of von Bertalanffy was $L_t = 26.63\ [1-e^{-0.274\ (t-(-1.009)}]$ and age distribution was between 0 and IV for *Barbus tauricus escherichi* inhabiting Yeşildere Stream, Rize. These differences may be due to ecological differences and/or sampling.

Sex composition was 45.5 % female, 45.5 % male and 9 % undetermined. Fork length and weight distribution of the population was between 6.6-21.3 cm and 4.03-122.83 g, respectively. There was no difference between females and males as regards mean length and weight values (t test, $P > 0.05$). The equation of standard length-fork length and fork length-total length relationships was FL = 1.0784SL + 1.1858 ($r^2 = 0.99$), TL = 1.0571FL + 0.2 ($r^2 = 0.99$), respectively. The values of the coefficient of determination (r^2) for TL-FL and FL-SL parameters of the Crimean barbel were very high; when caudal fins were torn or damaged, body length could be converted from one length to the other. Length-weight relationship was calculated as $W = 0.016FL^{2.904}$ [S.E. (b) = 0.00219 and 95% CI; 2.90149-2.91009] and growth of *B. tauricus* was negative allometric ($P < 0.001$) (Fig. 4). For the *Barbus tauricus escherichi* population inhabiting Yeşildere Stream (Rize, Turkey), length-weight relationship was determined as $W = 0.0114L^{2.9826}$ ($r = 0.993$) (Şahin *et al.*, 2007). Gaygusuz *et al.* (2012) found $W = 0.007L^{3.060}$ ($r^2 = 0.972$) for *Barbus tauricus* and the population showed positive allometry. It is known that season, area, environmental condition, sex, range and number of samples can affect WLR (Froese, 2006). The condition factor for the population was 1.2653.

For the *Barbus plebejus escherichi* population inhabiting Altınkaya Dam Lake (Turkey), the otolith was a reliable bony structure for age determination (Polat *et al.*, 1993). On the other hand, the otolith features of *B. tauricus* inhabiting the lower Melet River were more different than those of the Altınkaya Dam Lake population. Reliable bony structure changes for different populations of the same species and growth rate depending on ecological conditions affected bony structures.

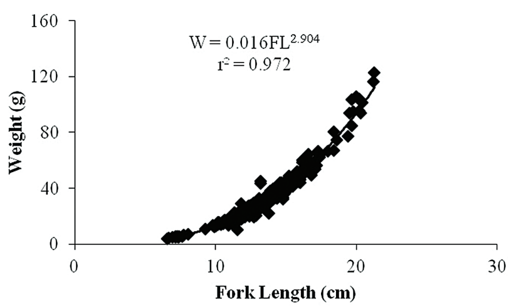

Fig. 4: Weight-length relationship of *Barbus tauricus*.

4. Growth of the oilfish *Ruvettus pretiosus* (Perciformes: Gempylidae) in the eastern Mediterranean

By P. Vasilakopoulos, C.D. Maravelias and G. Tserpes

The oilfish *Ruvettus pretiosus* (Cocco, 1829) is a cosmopolitan benthopelagic fish (Froese & Pauly, 2014). In the Mediterranean, it is an incidental low-value bycatch of surface and demersal longlines (Vasilakopoulos *et al.*, 2011). Previous studies of the species' biology have focused on its diet, reproduction and morphometrics (e.g. Vasilakopoulos *et al.*, 2011). No information on species' growth is available in the relevant literature, or in FishBase (Froese & Pauly, 2014). Here, we studied the growth of *R. pretiosus* in the southern Aegean and Cretan Seas.

Forty-six *R. pretiosus* specimens caught with surface and demersal longlines in 2007 and 2008 were sexed, their total length (TL) measured and their otoliths removed. For each specimen, otolith radius (R) and the distance from the centre of the otolith to the edge of each annual growth ring (R_i) were measured, whereas the number of annual growth rings was counted. In order to produce reliable growth parameter estimates from the small number of available specimens, an equation assuming an exponential relationship between TL and R was fitted and TL-at-age (TL_i) estimates were back-calculated from R_i (Francis, 1990). A von-Bertalanffy growth equation was then fitted over the back-calculated TL_i data. The analysis was performed in R (v3.0.2).

Ruvettus pretiosus specimens had a TL of 87 to 165 cm (Table 1). Only 11% (5 specimens) of the sexed fish were males and they were all smaller than 140 cm. Most (85%) specimens were 5-9 years old (Table 1). The back-calculation equation inferred from the TL-R relationship was:

$$TL_i = (R_i/R)^{0.775}\,TL \qquad (r^2 = 0.54) \qquad (1)$$

TL_i was back-calculated using (1) for all fish, producing 340 TL_i estimates over which a von Bertalanffy growth equation was fitted (Fig. 5). The estimates of the von Bertalanffy parameters were: $L_\infty = 162.3$ cm, $K = 0.25\ y^{-1}$ and $t_0 = -1.56$ y ($r^2 = 0.86$).

This is the first estimation of growth parameters for *R. pretiosus*. Most of the specimens examined were relatively old and large. Inclusion of smaller specimens in the analysis would assist in obtaining more objective growth parameter estimates, especially for younger ages. Also, the sex ratio in the sample was highly skewed in favour of the females. It is likely that the growth pattern of males

Table 1. Age-length key for the 46 aged *R. pretiosus* specimens.

TL (cm)	Age									
	3	4	5	6	7	8	9	10	11	12
80-90	1									
90-100										
100-110			1							
110-120										
120-130										
130-140				1	1	3	1			
140-150				2	2					
150-160				2	7	7	4	2		
160-170					2	6	1	1	1	1
Total	**1**	**0**	**1**	**5**	**12**	**16**	**6**	**3**	**1**	**1**

differs from that of females, as is the case for other Gempylid species e.g. *Promethichthys prometheus;* Lorenzo & Pajuelo, 1999. Thus, a larger sampling size, including more male specimens, would be more appropriate to detect possible differences in growth between sexes.

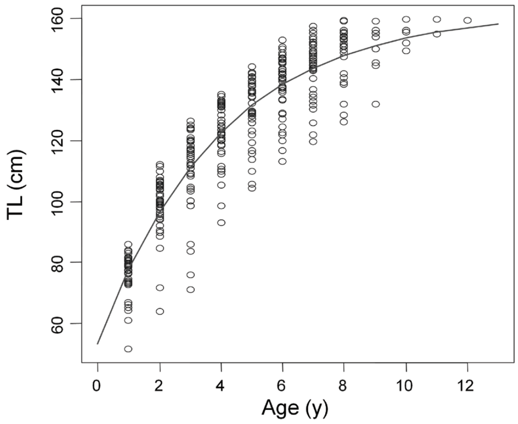

Fig. 5: Von Bertalanffy growth equation (black curve) fitted over 340 back-calculated total length (TL)-at-age estimates (open circles) for *Ruvettus pretiosus* in the eastern Mediterranean. Fitted von Bertalanffy equation for *R. pretiosus* was estimated as: $TL = 162.3*(1 - e^{-0.25*(Age + 1.56)})$, $r^2 = 0.86$.

5. Growth and length-weight relationship in juvenile bluefin tuna, *Thunnus thynnus*, from the Mediterranean Sea, south-eastern Sicily

By F. Tiralongo and D. Tibullo

The bluefin tuna, *Thunnus thynnus* (Linnaeus, 1758), is one of the most economically important tuna species in the world. It is a large pelagic species with a highly migratory behaviour. Its distribution is confined to the Atlantic and Mediterranean Sea. In the Mediterranean Sea, breeding occurs during summer: from June to August (Arena, 1979). As regards its importance as a spawning area, the Mediterranean Sea is one of the most important fishing zones (Mather *et al.,* 1995). In this study, we estimate growth and length-weight relationship in juveniles.

The study area was the southeast coast of Sicily, Ionian Sea, along the coast of Avola. Juveniles were caught as bycatch together with the target species dolphinfish (*Coryphaena hippurus*) in purseseines used by the local small scale fisheries. Indeed, in Sicily, as in other Mediterranean localities, fishermen use traditional FADs (Fish Aggregations Devices) to aggregate shoals, which are subsequently caught by purse seine (Castriota *et al.,* 2007). In addition to the juveniles of *Thunnus thynnus,* adults and juveniles of other pelagic species may aggregate around the FADs, together with dolphinfish (Andaloro *et al.,* 2007). In particular, we observed essentially three species such as pilot fish (*Naucrates ductor*), bullet tuna (*Auxis rochei*) and juveniles of the greater amberjack (*Seriola dumerili*). The period of study extends from 15 August 2014 (the beginning of the fishing season for the dolphinfish) to 10 October 2014. Throughout the study period (57 days), we carried out a total of 11 samplings. At each sampling, a total of 8 juveniles were randomly selected for measuring (total length in centimetres) and weighing (g).

In total, we collected data for 88 specimens with a mean length range of 23.3 - 40.2 cm and a mean weight range of 167-945 g (Table 2). As the graph of the simple linear regression clearly shows, the slope of the linear fit

Table 2. Maximum (max), minimum (min), Mean and Standard Deviation (SD) for both length (cm) and weight (g) in juvenile of *Thunnus thynnus* for each sample.

	Length (cm)				Weight (g)			
	max	min	Mean	SD	max	min	Mean	SD
Sample 1 (day 1)	24.4	22.3	23.3	0.8	186	150	167	12.4
Sample 2 (day 3)	25.6	22.8	24.5	1.1	218	128	173	29.5
Sample 3 (day 6)	26.2	22.9	25	1.3	233	150	197	32.2
Sample 4 (day 8)	27	24.2	25.9	0.9	252	160	218	27.6
Sample 5 (day 9)	31.1	22.2	25.9	2.5	404	131	227	78.7
Sample 6 (day 12)	27.9	22.7	25.8	1.9	274	137	207	51.5
Sample 7 (day 27)	32	26.4	29.9	2	481	227	357	82.2
Sample 8 (day 38)	33.6	24.9	30	3.2	520	178	363	127.5
Sample 9 (day 40)	37.6	32.9	36	1.4	767	285	642	151.5
Sample 10 (day 51)	37.8	31.5	35.2	2.4	792	354	600	140.7
Sample 11 (day 57)	42.9	37.2	40.2	2.3	1142	748	945	143.9

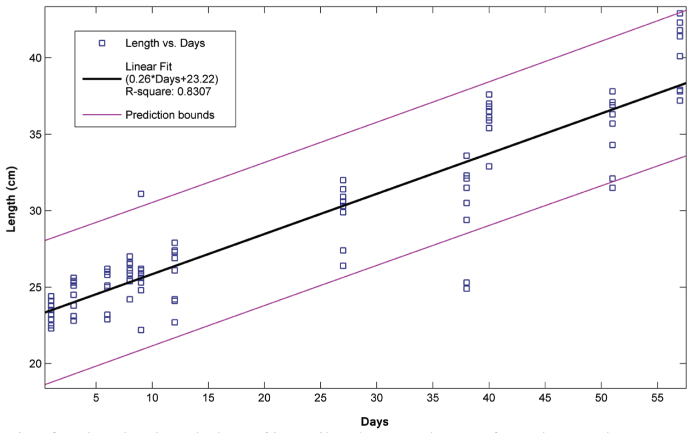

Fig. 6: Simple linear regression fitted to day-length data of juvenile *Thunnus thynnus* from the south-eastern coast of Sicily.

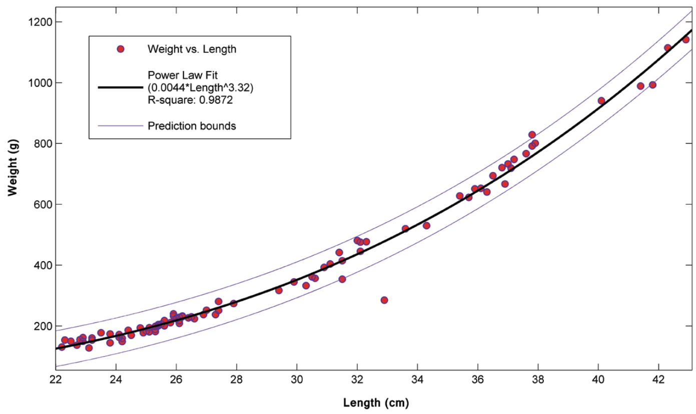

Fig. 7: Total length - weight relationship of juvenile *Thunnus thynnus* from the south-eastern coast of Sicily.

indicates a growth rate of 2.6 mm/day (Fig. 6). Concerning the relationship between the total length and the weight ($W= a L^b$) of the fish, this was determined from 88 specimens. As also shown for the species along the northern coast of Sicily (La Mesa *et al.,* 2005), Tyrrhenian Sea, in the Ionian Sea (south-eastern Sicily), positive allometric growth (b>3) was observed in the early life of the bluefin tuna: $W = 4.359 * 10^{-3}\ TL^{3,322}$ (n=88, $r^2= 0.99$) (Fig. 7). Considering the size and weight, the estimated age of sampled specimens should be comprised between about two and four months. The southeast coast of Sicily is another important zone for the growth of the juveniles of *Thunnus thynnus*, that find in this area a good availability of food, allowing the species to grow rapidly during the early phases of life. Moreover, we highlight the vulnerability of the species during this phase. Indeed, juveniles of *Thunnus thynnus* are easily and illegally caught by fishermen by trawling around the FADs from August to October, when the specimens are very close to the coast (1 - 3 miles). The vulnerability of the species is also accentuated by its voracity during this early stage. “Sport fishermen” use artificial bait, “raglou” in particular. With this technique it is possible to catch a large number of young tuna in a few hours. Then, when the specimens reach a size of about 42 cm (TL) and 1 Kg, they move away from the coast and are no longer captured around coastal FADs.

6. Weight-Length relationships of agujon needlefish *Tylosurus acus imperialis* (Rafinesque, 1810) in the Aegean Sea, Greece

By G. Minos and L. Kokokiris

The agujon needlefish *Tylosurus acus imperialis* is a marine epipelagic subspecies of *T. acus* restricted to the Mediterranean Sea (Froese & Pauly, 2014). Other subspecies recognised according to their geographical distribution are: *Tylosurus acus acus* (Lacepède, 1803) in the Western Atlantic, *Tylosurus acus rafale* Collete & Parin, 1970 in the Gulf of Guinea and *Tylosurus acus melanotus* (Bleeker, 1850) throughout the Indo and Western Pacific and extending into the Eastern Pacific (Froese & Pauly, 2014). Biological information for the agujon needlefish for the Mediterranean Sea is poor since there are only a few reports on its

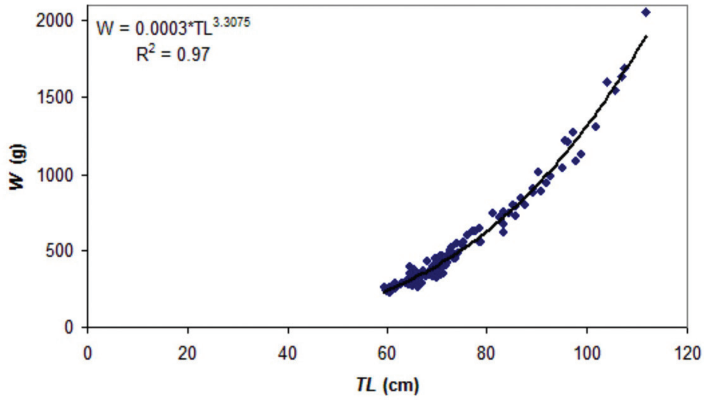

Fig. 8: Weight (W)-Length (total length: TL) relationship of *Tylosurus acus imperialis* in the North Aegean Sea.

appearance (Türker Çakır & Zengin, 2013 and references therein) and studies on the parasites (Châari *et al*., 2013).

In this work the Weight-Length relationships (WLR) of *T. acus imperialis* were studied for the first time in a population of the North Aegean Sea.

From June 2013 to July 2014, 112 specimens of agujon needlefish were collected from commercial fisheries in Thermaikos Gulf, North Aegean Sea. The specimens were captured from a depth of *ca* 1-3 m using gillnets, night spear fishing from boat and arrowhead fixed fish trap. At the laboratory, specimens were weighed (W, in g) and total (TL), head (HL), fork (FL), body (BL) and standard (SL) length were measured (to the nearest mm). Sex was defined by visual examination of the gonads.

Overall, 112 individuals were collected, 81 males and 31 females. Total length (TL) ranged from 59.3 to 111.6 cm (males: 59.3 to 107.4 cm; females: 64.5 to 111.6 cm) and weight (W) ranged from 232 to 2054 g (males: 232-1690 g; females: 398-2054 g).

The weight-length relationships estimated for combined sexes were: $W=0.0003*TL^{3.3075}$ (R^2=0.97, SE_b=0,056) (Fig. 8), $W=0.0005*SL^{3.2695}$ (R^2=0.96, SE_b=0.061), $W=0.0004*FL^{3.3118}$ (R^2=0.96, SE_b=0.061), $W=0.0036*BL^{3.0891}$ (R^2=0.97, SE_b= 0.055), respectively for *TL, SL, FL* and *BL* and appeared allometric growth (P>0.05) for *TL, SL* and *FL* and isometric growth (P<0.05) for *BL*. The L-L relationships were: $SL=0.5285+0.8948*TL$ (R^2=0.99), $FL=0.662+0.9385*TL$ (R^2=0.99), $BL=-3.8097+0.6731*TL$ (R^2=0.99), $HL=3.7843+0.2337*TL$ (R^2=0.96).

For males (n=81) it was $W=0.0003*TL^{3.3198}$ (R^2=0.96, SE_b= 0.077) indicating an allometric growth (P>0.05) and for females (n=31) $W=0.0008*TL^{3.119}$ (R^2=0.97, SE_b= 0.099) indicating an isometric growth (P<0.05).

There are no published WLR data for either *T. acus imperialis* or *T. acus acus*. For *Tylosurus acus melanotus,* Liao & Chang (2011) reported the eye fork length (EFL) - weight (W) relationship for females as W=0.0139*$EFL^{2.72}$ (n=3.29, P<0.05) and for males as W=0.0065*$EFL^{2.91}$ (n=329, P<0.05) while for both sexes it was W=0.012*$EFL^{2.76}$ (n=658, P<0.05). The range of *EFL* was 35.9 - 102.8 cm and the relation between eye fork length (*EFL)* and total length (*TL*) was: *EFL* = -6.44 + 0.82***TL*.

7. Biological data on the royal Flagfin *Aulopus filamentosus* (Bloch, 1792) from the Gulf of Tunis (Central Mediterranean)

By A. Romdhani, I. Chater and M.-H. Ktari

The royal flagfin *Aulopus filamentosus* (Bloch, 1792) is distributed in the Mediterranean Sea and the Atlantic Sea (Froese & Pauly, 2014). In Tunisia, *A. filamentosus* was reported in the Gulf of Gabes (Bradai *et al*., 2004) and in the north eastern areas (Ben Souissi *et al*., 2010). The main objective of this study is to provide information on several aspects of the biology of *A. filamentosus* from the Tunisian coasts (Fig. 9).

A total of 28 specimens of *A. filamentosus* were analysed; two specimens were collected in May 2008 and the rest in May 2009, by sampling the commercial landings of the small-scale fisheries of the Gulf of Tunis. All specimens were weighed (total weight; TW) and measured (total length; TL) and the weight-length equation was established, using the following equation: $TW = aTL^b$. Then, stomach content was examined. Prey found in the stomachs, were identified to the lowest

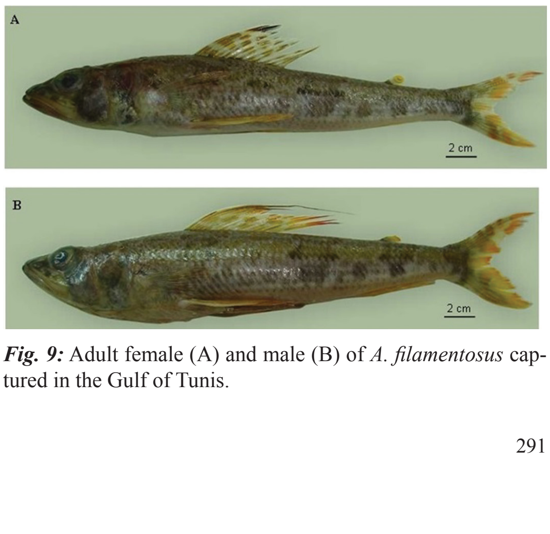

Fig. 9: Adult female (A) and male (B) of *A. filamentosus* captured in the Gulf of Tunis.

possible taxon and data were quantified using numerical methods such as percent by frequency of occurrence (% O), percent by number (% N), percent by weight (% W) and index of relative percentage (% IRI) (Hyslop, 1980).

The weight-length relationship of the royal flagfin, estimated for both sexes of *A. filamentosus* combined, was TW = 0.002 $TL^{3.278}$. The statistical analysis shows that the type of growth is isometric ($t = 1.15$; $p > 0.05$). Conversely, in the Aegean Sea Yapici *et al*. (2014), found that there is a positive allometric relationship.

The trophic spectrum of *A. filamentosus* consisted mainly of fishes, while Crustaceans was secondary/accidental prey (Table 3), regardless of the index examined. Yet, the state of digestion of the various preys consumed by the specimens examined was very advanced, a fact that prevented more precise determination of the species on which *A. filamentosus* feeds. According to Ben Souissi *et al*. (2010), in Tunisian waters, *A. filamentosus* feeds on decapods and cephalopods.

Additionally, the gonads of the specimens were examined. The ovaries were flaccid, not very vascularized and pink-reddish whereas the testes were white-grey in colour suggesting that these specimens were in the post spawning stage, thus indicating that the species reproduces in the area.

Table 3. Number and weight percentage composition of prey items found in the stomachs of *A. filamentosus* from the Gulf of Tunis.

Prey Group	Prey	%N	%W	%F	%IRI
Crustacea	Isopoda				
	Cirolona borealis	39.47	5.73	34.78	6.51
	Unidentified Decapoda	10.53	2.17	13.04	1.75
Fish	Unidentified fishes	50	54.52	56.52	48.23

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