

First documented record of smalleye squaretail *Tetragonurus cuvieri* Risso, 1810 (Perciformes, Stromatoidea) along Calabrian coasts (Southern Italy, Central Mediterranean)

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*The first record of *Tetragonurus cuvieri* Risso, 1810 off Calabrian coast (Southern Italy, Central Mediterranean) is reported. The specimen, a male of 361 mm total length, was found at a depth of 7 m during a scientific visual census research activity, in March 2017. The sighting was located off the Tyrrhenian coast of Calabria (Paola: 39.355453N, 16.029192E). The present finding represents the 1st documented record for the Tyrrhenian coast of the Calabria region*

Key words: *Tetragonurus cuvieri*; biometrics; Calabria; Central Mediterranean; new record

INTRODUCTION

The small eye squaretail *Tetragonurus cuvieri* Risso, 1810, is a meso-bathypelagic medium sized fish. Youngs are commonly inquiline in pelagic tunicates, especially *Salpa* and *Pyrosoma*, while adults appear to be solitary. The species shows a wide geographical distribution, occurring in warm and temperate waters of the Pacific, Indian and Atlantic Oceans and the Mediterranean Sea (FROESE & PAULY, 2019). In the Mediterranean Sea the species was traditionally considered as very rare (TORTONESE, 1970) and it has been exclusively reported in the western basin (FONS & VILLIERS, 1979; BERDAR *et al.*, 1982; DEMESTRE & ROIG, 1982; FREDJ & MAURIN, 1986; HAEDRICH, 1986). The first docu-

mented capture of the smalleye squaretail in the Eastern basin occurred in the Ionian Sea in 1997 (BASANISI *et al.*, 1999). In the Italian waters (Fig. 1), this fish is historically known for the Ligurian Sea (CAMPI, 1963), but the species has been also reported from Sardinia (CAU, 1980), Elba Island (D'ANCONA & RAZZAUTI, 1937), in the Gulf of Naples (EMERY, 1882) and off Palermo (SARÀ & SARÀ, 1990). In the Strait of Messina larval and post-larval forms have been found several times (BERDAR *et al.*, 1982). The most recent captures of the smalleye squaretail have occurred in the Sicilian Channel (RAGONESE & GIUSTO, 2003) and off the coast in front of Anzio (PSOMADAKIS *et al.*, 2006). This note reports the first finding of the smalleye squaretail off the Tyrrhenian coast of Calabria following indications suggested by BELLO *et al.* (2014).

MATERIAL AND METHODS

The specimen was found swimming at a depth of just 7 m on 21st March 2017 off the Tyrrhenian coast of Calabria (locality: Paola; coordinates: 39.355453N, 16.029192E). During the capture, which took place with a speargun, the fish took on a dark color. Once out of the water, the fish was frozen and transported to the Laboratories of the Department of Biology, Ecology and Earth Sciences (DiBEST) of the University of Calabria. There, the specimen was defrosted, photographed, weighed and measured by using a measuring board, a digital caliper and a digital scale (SPERONE *et al.*, 2018). The most relevant meristic counts were also recorded. Taxonomic identification and general nomenclature were mainly based on the specific literature (TORTONESE, 1970; HAEDRICH, 1986). The specimen was dissected according to standard procedures (COMAS *et al.*, 2014), sex was defined according with the MEDITS maturity scale for bony fish (FOLLESA & CARBONARA, 2019). The gonadosomatic index (GSI) was estimated according to the formula: $GSI = [\text{gonad weight} / \text{total body weight}] \times 100$. The whole specimen was preserved in freezer and stored in the DiBEST collection with code Tc0001.

RESULTS

The specimen of *T. cuvieri* showed a typical uniform black color pattern (Fig. 2). It was also recognized by its distinctive jaws, scalation and body form. In particular, the lower jaw was very stout and had a single row of fan-like teeth. It was almost totally concealed by the upper jaw when the mouth was closed. The upper jaw had small pointed teeth in a single row (FROESE & PAULY, 2019). The long and slender body was rounded in cross section and was characterized by the presence of small, ridged scales arranged in spirals around the body (TORTONESE, 1970; HAEDRICH, 1986). The caudal peduncle was rectangular in cross-section and had two lateral keels on both sides. The basic morphometric measures (as absolute values and indexes of total length) and meristic counts are given in



Fig. 1. Italian records of *Tetragonurus cuvieri*. For further details see the "Introduction" section of the main text

Tab. 1. Our values were compared with those available from RAGONESE & GIUSTO (2003) and did fall within the ranges of the species (TORTONESE, 1970; HAEDRICH, 1986). The specimen has been, then, dissected in order to determine the sex and the reproductive stage. It was a male and the testis was whitish-creamy and soft, with a length of 108.3 mm (body cavity length was of 180 mm) and a weight of 17.77 g. The ratio between the length of the gonad and the length of the body cavity was 0.6, about 2/3. Under light pressure, sperm was easily expelled; the GSI value of the specimen was 7.49 (Tab. 1).

DISCUSSION

Tetragonuridae is a widespread distributed family and it includes only the genus *Tetragonu-*

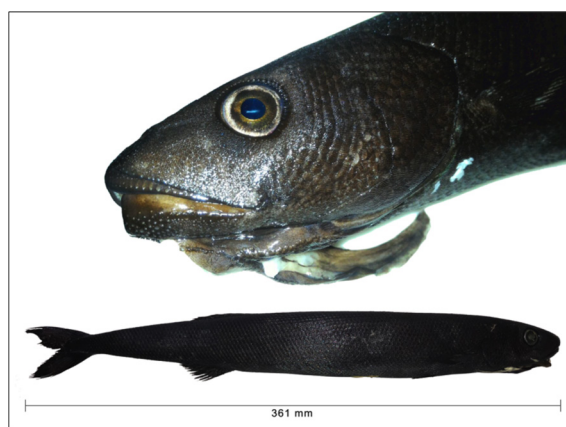


Fig. 2. *Tetragonurus cuvieri* Risso, 1810, 361 mm total length captured off Paola (Calabrian region) on 21st March 2017. Above: particular of the head. Below: the whole specimen

Table 1. Basic measures and meristic counts of the specimen of *Tetragonurus cuvieri* Risso, 1810, 361 mm (TL), from Calabria. The data are compared with the homologous values of the specimen reported in RAGONESE & GIUSTO (2003)

Measurements (mm or g) or counts	Present specimen absolute values	Present specimen % TL range	Specimen from RAGONESE & GIUSTO, 2003
Total length	361	100.00	354
Standard length	312.2	86.48	330
Anus-snout tip space	209	57.89	201
Weight	237.4	-	252
Body height	42	11.63	47
Head length	59	16.34	60
Preorbital space	18	4.98	19
Postorbital space	28	7.70	30
Interorbital space	18	5.00	17
Higher jaw length	25	6.9	25
Lower jaw length	21	5.81	22
Horizontal eye diameter	11	3.04	11
Vertical eye diameter	12	3.32	11
Caudal peduncle height	44	12.40	42
1st dorsal fin – snout tip space	103	28.53	113
2nd dorsal fin – snout tip space	202	55.95	202
Interdorsal fins length	86	23.82	15
Anal fin - snout tip space	213	59.00	210
Pectoral fin - snout tip space	61	16.89	65
Pelvic fin - snout tip space	84	23.26	84
Body thickness	35.7	9.88	33
1 st dorsal fin rays	20	-	18
2 nd dorsal fin rays	13	-	11
1 st dorsal fin height	25	6.92	9
2 nd dorsal fin height	21	5.81	21
1 st dorsal fin base length	16	4.43	74
2 nd dorsal fin base length	36	9.97	33
Pectoral fin rays	18	-	16
Pectoral fin height	29	8.03	26
Pectoral fin base length	8	2.21	7
Pelvic fin rays	8	-	5
Pelvic fin height	16.5	4.57	14
Pelvic fin base length	5	1.38	no data
Anal fin rays	10	-	11
Anal fin height	20	5.54	39
Anal fin base length	28	7.75	30
Caudal fin rays	26	-	28
Caudal fin length	43	11.91	38
N° of gill arches	5	-	5
Sex	male	-	no data
Testis length	108,3	30.00	no data
Testis weight	17.77	-	no data
IGS	7.49	-	no data
Body cavity length	180	49.86	no data

rus with three species: *Tetragonurus pacificus* Abe 1953, *Tetragonurus atlanticus* Lowe 1839 and *T. cuvieri*. All species live in warm and temperate oceanic waters: the young has epipelagic habits and the adults presumably is mesopelagic (HAEDRICH, 1986). Their teeth are specially adapted for browsing on soft-bodied coelenterates (medusae), ctenophores and especially salps; sometimes they also take plankton. Jellyfishes and large salps also serve as refugium for juveniles (BERDAR *et al.*, 1982). According to FOLLESA & CARBONARA (2019) we determined the specimen phases of the spawning cycle: since the testis was whitish creamy and soft with a length of about 2/3 to full length of the body cavity, and the high value of GSI, we can assume that it was in stage 3 (mature/spawner). As far as we know, spawn takes place during spring and summer in the Atlantic but ripe females have been taken throughout the year in the Mediterranean (FROESE & PAULY, 2019).

However, although there is no general agreement about the reproductive seasonality in the Mediterranean for this species, some authors have suggested that the ripe females went up in the water column to reproduce, a moment in which they should be more vulnerable to the capture (FONS & VILLIERS, 1979). Since our specimen was a mature/spawner male and it has been caught at -7 m depth without any clear sign of decompression phenomena, and considering that the Tyrrhenian has been demonstrated to be a spawning area (BERDAR *et al.*, 1982) for the species, we could speculate that it had risen to the surface to reproduce. This record confirms the importance of the Calabrian Tyrrhenian Sea as a reproductive and a migration area for many vulnerable, rare or little-known animal species between the eastern and western Mediterranean (SANTORO *et al.*, 2015; SPERONE & MILAZZO, 2018; SPERONE *et al.*, 2019).

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**Prvi dokumentirani zapis o *Tetragonurus cuvieri* Risso, 1810.
(Perciformes, Stromatoidea) duž kalabrijskih obala (Južna Italija,
Središnji Mediteran)**

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SAŽETAK

Objavljen je prvi podatak o *Tetragonurus cuvieri* Risso, 1810. godine u blizini kalabrijske obale (Južna Italija, Središnji Mediteran). Primjerak mužjaka ukupne dužine 361 mm, pronađen je na dubini od 7 m, u ožujku 2017. godine u blizini Tirenske obale Calabrie (Paola: 39.355453N, 16.029192E). Ovaj nalaz predstavlja prvi dokumentirani zapis za Tirensku obalu pokrajine Calabria.

Ključne riječi: *Tetragonurus cuvieri*; biometrija; Calabria; središnji Mediteran; novi nalaz