

Additional data on the rare fish *Microichthys sanzoi* (Epigonidae) from the central Mediterranean Sea

Pietro BATTAGLIA^{1*}, Giovanni AMMENDOLIA², Valentina ESPOSITO¹,
Teresa ROMEO¹ and Franco ANDALORO³

¹ISPRA, Institute for Environmental Protection and Research, Laboratory of Milazzo,
via dei Mille 44, 98057 Milazzo (ME) – Italy

²Via Consolare Pompea 3 - Coop. Sicilianella, 98168 Messina (ME) – Italy

³ISPRA, Institute for Environmental Protection and Research,
c/o Residence Marbela, via Palermo – Italy

*Corresponding author, e-mail: pboceano@libero.it; pietro.battaglia@isprambiente.it

The finding of a rare specimen of *Microichthys sanzoi* (Epigonidae) stranded on the shore on the Sicilian coast of the Strait of Messina (central Mediterranean Sea) is reported. Morphometric and meristic characters are given and the first colour photograph of a fresh specimen is provided. Information on its prey items is provided together with additional data on otolith morphology.

Key words: Epigonidae, *Microichthys sanzoi*, prey, otoliths, Mediterranean Sea, stranding

INTRODUCTION

The family Epigonidae (deepwater cardinal-fishes) includes overall 41 known fish species, 5 of which are living in the Mediterranean Sea. The Mediterranean epigonids belong to two genera: i) *Epigonus* with the species *E. costanciae* (Giglioli 1880), *E. denticulatus* Dieuzeide 1950 and *E. telescopus* (Risso, 1810); and ii) *Microichthys* including the only two known species *M. coccoi* (Rüppell, 1852) and *M. sanzoi* Sparta, 1950.

These species are poorly known and their distributional range in the Mediterranean waters is only approximately traced. In particular, the *Microichthys spp.* are characterized by very small individuals, that usually avoid fishing gears and cannot be easily collected. The few information on these fishes come from the col-

lection of stranded specimens along the Sicilian coast of the Strait of Messina (central Mediterranean Sea). Indeed, since the 19th century, the periodic monitoring of this phenomenon due to the upwelling and tidal currents of the area has made possible the study of rare and uncommon fish species belonging to mesopelagic and deep-sea fauna (MAZZARELLI, 1909; GENOVESE *et al.*, 1971; BERDAR *et al.*, 1983), allowing also in the last years to extend the knowledge on these species (BATTAGLIA *et al.*, 2010, 2012, 2013).

In this paper the finding of a stranded specimen of *M. sanzoi* is reported, 30 years after its last record in 1983 (BERDAR & LI GRECI, 1986). This species is currently considered endemic from the Strait of Messina (TORTONESE, 1970, 1986; BAUCHOT, 1987) and data on its biology and ecology are not available in the literature. This record provides new information on the prey of



Fig. 1. The specimen of *Microichthys sanzoi* (TL = 51.1 mm) found stranded on shore of the Strait of Messina on 29th March 2013

this species and allows to deepen the current knowledge on the morphology of its sagittal otoliths.

MATERIAL AND METHODS

On 29th March 2013 a specimen of *M. sanzoi* (Fig. 1) was found stranded on the shore (38°15'48"N; 15°38'13"E) along the Sicilian coast of the Strait of Messina. Its taxonomical identification was carried out according to SPARTÀ (1950). The individual was photographed and morphometric data to the nearest 0.1 mm, mass to the nearest 0.01 g and meristic characteristics were recorded (Table 1). Sagittal otoliths were removed, cleaned, photographed and stored dry. Their description follows the terminology of TUSET *et al.* (2008). The maximum

length (OL) and height (OH) of each sagitta were measured to the nearest 0.01 mm by stereomicroscope Zeiss Discovery V8 coupled with Axiovision digital image processing software. Sex was determined by macroscopical observation of the gonads and a gonadal maturity stage was assigned following the scale proposed by HOLDEN & RAITT (1974). Stomach content was examined in order to obtain information on the prey of this species.

The specimen was preserved in 80% ethanol solution and was deposited in the ISPRA collection with the following code number ISPRA-MIC-SAN-001.

RESULTS

The taxonomical features of the specimen examined in the present study matched the description of *M. sanzoi* provided by SPARTÀ (1950). The body is elongated and compressed, covered by cycloid scales, with a quite large head (26% of TL), two dorsal fins and very developed black and plumose pelvic fins (25% of TL). The fresh coloration of *M. sanzoi* is peculiar; in particular, a large black spot is present behind each eye and another one covers the caudal peduncle. Just before this last spot, a black strip crosses vertically the body (Fig. 1).

Morphometric, proportions and meristic data as well as some biological information are

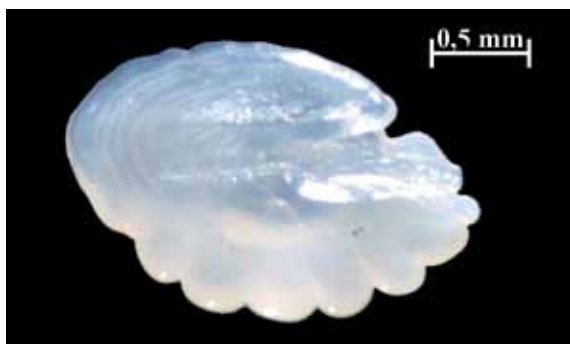


Fig. 2. Left sagittal otolith of *Microichthys sanzoi*

Table 1. Morphometric, meristic and biological data of a specimen of *Microichthys sanzoi* stranded on the shore of the Strait of Messina

Measurements and Proportions	mm
Total length (TL)	51.1
Standard length	42.2 (82.6% TL)
Caudal length	8.9 (17.4% TL)
Head length (HL)	13.3 (26.0% TL)
Operculum – tail distance	28.9 (56.6% TL)
Preorbital length	3.8 (28.6% HL)
Eye – operculum distance	5.2 (39.1% HL)
Horizontal eye diameter	3.8 (28.6% HL)
Vertical eye diameter	4.3 (32.3% HL)
I Predorsal length	16.0 (31.3% TL)
II Predorsal length	24.4 (47.7% TL)
Prepectoral length	12.8 (25.0% TL)
Preanal length	27.3 (53.4% TL)
Preventral length	13.7 (26.8% TL)
Pectoral fin length	7.0 (13.7% TL)
Pelvic fin length	12.8 (25.0% TL)
Base I dorsal fin	4.7 (9.2% TL)
Base II dorsal fin	4.2 (8.2% TL)
Base anal fin	3.0 (5.9% TL)
Upper jaw length	5.4 (40.6% HL)
Lower jaw length	6.6 (49.6% HL)
Maximum trunk height after the operculum	11.0 (21.5% TL)
Minimum trunk height at caudal peduncle	5.0 (9.8% TL)
Maximum height at anus	9.5 (18.6% TL)
<i>Meristic data</i>	
First dorsal fin rays	1 + 6
Second dorsal fin rays	1 + 9
Anal fin rays	11 + 9
Pectoral fin rays	20
Pelvic fin rays	1 + 5
<i>Biological data</i>	
Mass (g)	1.55
Sex	M
Maturity stage	II

reported in Table 1. Macroscopic analysis of the gonads showed that the specimen was male in the second stage (II) of maturity according to the HOLDEN & RAITT (1974) scale.

Stomach analysis revealed remains of three adult copepod crustaceans, two of which belonging to the genus *Calanus* and another one identified as *Pleuromamma gracilis* Claus, 1863. Moreover, remains of a chaetognath were found.

A re-description of sagittal otolith is here provided as follows, according to TUSET *et al.* (2008): Shape: elliptic, with ventral area slightly more developed; lobed ventral margin and entire to sinuate dorsal margin. *Sulcus acusticus*: heterosulcoid, ostial, median. *Ostium*: funnel-like to rectangular. *Cauda*: tubular, straight, wider posteriorly, ending close to the posterior margin. Anterior region: double peaked; rostrum short, broad, slightly pointed; antirostrum short, pointed; excisura with an acute notch. Posterior region: round. Right sagitta: OL = 2.24 mm and OH = 1.51 mm; Left sagitta: OL = 2.21 mm and OH = 1.52 mm.

DISCUSSION

Microichthys sanzoi is a quite recently validated fish species: its validity has been debated for approximately 25 years, since *M. sanzoi* was considered a doubtful species, likely belonging to the species *M. coccoi* or to a juvenile stage of another epigonid fish (TORTONESE, 1973; CAVALLARO *et al.*, 1974; CAVALLARO, 1977). Indeed, after the first species description by SPARTÀ (1950) which examined an individual of 66.5 mm TL, no other specimens have been found until 1973, when CAVALLARO *et al.* (1974) reported the stranding of a younger individual measuring 26.6 mm TL. By that time, the specimen found by SPARTÀ (1950) was lost and comparison was impossible. CAVALLARO *et al.* (1974), CAVALLARO (1977) and later BERDAR & LI GRECI (1986) dispelled any doubt on the validity of *M. sanzoi* by comparing its taxonomical characters with the ones of *M. coccoi*. In particular, BERDAR & LI GRECI (1986) investigated morphology of *M. sanzoi*, by examining a specimen of 30 mm TL and describing for the first time the otoliths of this species. However, the comparison between our sample

and the otolith drawing reported by BERDAR & LI GRECI (1986) highlights some important differences in the sagittal ventral margin and in the *antirostrum* region. These differences may be ascribed to the bad conditions of otoliths examined by BERDAR & LI GRECI (1986), likely owing to the preservation method of this sample: the Authors found the specimen on 17th April 1983 and reported that it had been preserved for several months in 5% formaldehyde solution before its analysis. Moreover the sagittal otolith drawing of this specimens exhibits a clear damage in the *antirostrum*. In addition, the differences in otolith shape might be in part due to size differences between specimens. The re-description of the sagittal otoliths of *M. sanzoi* provides useful

taxonomical information to fill the gap about the general knowledge of this species, but above all may represent a valid support in dietary studies, helping the identification of this species in stomach of potential predators.

Furthermore, the present paper provides some new information on the diet of *M. sanzoi*, thanks to the analysis of its stomach content, that highlighted a planktivorous feeding behaviour. The type of prey observed in the gut suggests that predation occurred in pelagic waters. Differently, BERDAR & LI GRECI (1986) found only a polychaete in an advanced degree of digestion and they were not able to establish if the prey belonged to a pelagic or a benthic realm.

REFERENCES

- BATTAGLIA, P., D. MALARA, T. ROMEO & F. ANDALORO. 2010. Relationships between otolith size and fish size in some mesopelagic and bathypelagic species from the Mediterranean Sea (Strait of Messina, Italy). *Sci. Mar.*, 74(3): 605-612.
- BATTAGLIA, P., G. AMMENDOLIA, T. ROMEO & F. ANDALORO. 2012. Finding of *Eretmophorus kleinenbergi* (Moridae) in the central Mediterranean Sea 93 years after its previous record, with a first description of sagittae and fresh coloration. *Mar. Biodiv. Rec.*, 5: (e20).
- BATTAGLIA, P., G. AMMENDOLIA, T. ROMEO, V. ESPOSITO & F. ANDALORO. 2013. Additional data of the infrequent deep water eel *Facciollella oxyrhyncha* (Bellotti, 1883) (Nettastomatidae) from its type locality, the Strait of Messina, central Mediterranean Sea, including a rare post-larval specimen. *Cah. Biol. Mar.*, 54: 319-323.
- BAUCHOT, M.-L. 1987. Poissons osseux. In: W. Fischer, M.L. Bauchot & M. Schneider (Editors). Fiches FAO d'identification pour les besoins de la pêche (rev. 1). Méditerranée et mer Noire. Zone de pêche 37. Vol. II. Commission des Communautés Européennes and FAO, Rome, p. 961.
- BERDAR, A., A. CAVALIERE, G. CAVALLARO, G. GIUFFRÈ & A. POTOSCHI. 1983. Lo studio degli organismi spiaggiati nello Stretto di Messina negli ultimi due secoli. *Nat. Sicil.*, S.IV, 7(1-4): 3-17.
- BERDAR, A.L. & F. LI GRECI. 1986. Contribution to morphology and studies on the otolithes of a specimen belonging to *Microichthys sanzoi* Spartà, 1950 (Pisces, Apogonidae) stranded along the beach of «Cape Peloro» Messina (Sicily). *Oebalia*, N.S.13: 33-47.
- CAVALLARO, G., A. POTOSCHI & G. GIUFFRÈ. 1974. Ritrovamento di *Microichthys sanzoi* Spartà e note sulla sua validità (Pisces, Apogonidae). *Mem. Biol. Mar. Oceanogr.*, 4(1): 13-21.
- CAVALLARO, G. 1977. Il genere *Microichthys sanzoi* (Pisces, Apogonidae). *Riv. Biol. Norm. Patol.*, 3(4): 147-156.
- GENOVESE, S., A. BERDAR & L. GUGLIELMO. 1971. Spiaggiamenti di fauna abissale nello Stretto di Messina. *Atti Soc. Pelorit.*, 17: 331-370.
- HOLDEN, M. J. & D. F. S. RAIT. 1974. Manual of fisheries science. Part 2. Methods of resource investigation and their application. FAO Fish. Tech. Pap. No. 115 (Rev. 1). Atti Soc. Rome, Italy.
- MAZZARELLI, G. 1909. Gli animali abissali e le correnti sottomarine dello Stretto di Messina. *Riv. Mens. Pesca Idrobiol.*, 11: 177-218.
- SPARTÀ, A. 1950. Su di una nuova specie di *Microichthys*: *Microichthys sanzoi* (n.sp.). *Boll.*

- Pesca Pisc. Idrobiol., 5(2): 3-7.
- TORTONESE, E. 1970. Osteichthyes (Pesci ossei), Parte Seconda. Fauna Ital., Calderini, Bologna, vol 10, pp. 54-55.
- TORTONESE, E. 1973. Apogonidae. C.L.O.F.N.A.M., Unesco, I, p. 367.
- TORTONESE, E. 1986. Apogonidae. In: P.J.P. Whitehead, M.-L. Bauchot, J.-C. Hureau, J. Nielsen & E. Tortonese (Editors). Fishes of the north-eastern Atlantic and the Mediterranean. UNESCO, Paris, 2: 803-809.
- TUSET, V.M., A. LOMBARTE & C.A. ASSIS. 2008. Otolith atlas for the western Mediterranean, north and central eastern Atlantic. Sci. Mar., 72S1: 1-203.

Received: 10 January 2014

Accepted: 13 May 2014

Dodatni podaci o rijetkoj ribi *Microichthys sanzoi* (Epigonidae) iz središnjeg dijela Sredozemnog mora

Pietro BATTAGLIA^{1*}, Giovanni AMMENDOLIA², Valentina ESPOSITO¹,
Teresa ROMEO¹ i Franco ANDALORO³

¹*ISPRA, Institut za istraživanje i očuvanje okoliša, Laboratorij u Milazzo,
via dei Mille 44, 98057 Milazzo (ME), Italija*

²*Kooperativa Sicilianella, Via Consolare Pompea 3, 98168 Messina (ME), Italija*

³*ISPRA, Institut za istraživanje i očuvanje okoliša,
c/o Residence Marbela, via Palermo, Italija*

**Kontakt adresa, e-mail: pboceano@libero.it; pietro.battaglia@isprambiente.it*

SAŽETAK

U ovom radu je prikazan nalaz jedinke rijetke ribe *Microichthys sanzoi* (Epigonidae) koja je nanesena na obalu u blizini Mesinskog tjesnaca (središnji dio Sredozemnog mora). Iznese su osnovne morfometrijske i merističke značajke jedinke kao i njena prva fotografija u boji u svježem stanju. Također su prikazani i podaci o plijenu koji je utvrđen u njenom probavnom sustavu zajedno sa dodatnim podacima o morfologiji otolita.

Ključne riječi: Epigonidae, *Microichthys sanzoi*, plijen, otoliti, Sredozemno more, nanensena jedinka