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MORPHOMETRICS OF NEONATE VELVET BELLY, *ETMOPTERUS SPINAX* (LINNAEUS, 1758)

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ABSTRACT

*Biological details on four neonates of the velvet belly, *Etmopterus spinax* (Linnaeus, 1758), caught at the beginning of 2000 at Viareggio (Ligurian Sea), are reported. The specimens, two females and two males, measured 108 mm, 110 mm, 142 and 153 mm in length. Morphometrics of these specimens is presented. Captures of these specimens occurred near Viareggio, suggesting that this region may be a nursery area for *E. spinax*.*

Key words: velvet belly, *Etmopterus spinax*, reproduction, Ligurian Sea

MORFOMETRIA DEL NEONATO DI MORETTO, *ETMOPTERUS SPINAX* (LINNAEUS, 1758)

SINTESI

*Viene segnalata la cattura di quattro piccoli di moretto, *Etmopterus spinax* (Linnaeus, 1758), pescati a Viareggio (Mar Ligure) all'inizio del 2000. Gli esemplari, 2 femmine e 2 maschi, presentavano lunghezze totali pari a 108 mm, 110 mm, 142 mm e 153 mm. Dei quattro esemplari vengono esposti completi rilevamenti morfometrici. Varie catture di piccoli appena nati registrate presso Viareggio suggeriscono che questa zona sia una nursery area per *E. spinax*.*

Parole chiave: moretto, *Etmopterus spinax*, riproduzione, Mar Ligure

INTRODUCTION

The velvet belly, *Etmopterus spinax* (Linnaeus, 1758) is a small selachian of the family Etmopteridae Fowler 1934, characterized principally by the presence of two grooved dorsal spines (the second longer than the first), lack of the anal fin, and by the presence of photophores distributed in specific patterns on the ventral surface (Fig. 1). The upper teeth have five cusps and the lower teeth are bladelike and unicuspidate. The denticles have a long, slender and slightly grooved crown (Tortonese, 1956). This species rarely exceeds 45 cm in length, but it may reach lengths of at least 60 cm and possibly as much as 115 cm (Cadenat & Blache, 1981; Compagno, 1984; Bauchot, 1987). *E. spinax* matures at a length between 280 and 360 mm, and is ovoviviparous, with litters of 6-20 pups (Compagno, 1984; Bauchot, 1987). Parturition occurs year-round (Vacchi & Relini Orsi, 1979) and the size at birth is 120 to 140 mm (Compagno, 1984) or 100 to 110 mm (Vacchi & Relini Orsi, 1979; Bauchot, 1987; Barrull *et al.*, 1999). Its diet is composed of small fishes, squids and crustaceans (Compagno, 1984). This species lives near or above the bottom on the outer continental shelf and upper lobe usually at depths between 200 and 500 m (Compagno, 1984). The velvet belly's distribution includes the Mediterranean Sea and almost all of the eastern Atlantic, from Iceland and Norway to Morocco, Senegal, Sierra Leone, from Ivory Coast to Nigeria, from Cameroon to Gabon, Azores, Cape Verde Islands, South Africa (Bigelow & Schroeder, 1957; Compagno, 1984). *E. spinax* is occasionally caught in bottom and pelagic trawls, and utilized for fishmeal, for liver oil, and rarely for human consumption (fresh or dried), except in Morocco, where it can be found often at the fishmarkets (Compagno, 1984; Bauchot, 1987). Morphometrics of five specimens ranging from 153 to 204 mm in total length (TL) were recently reported in Kabasakal & Unsal (1999).

Morphometric measurements of four young *E. spinax* are presented herein, with the purpose to contribute to the knowledge of the velvet belly's morphology and to

furnish an additional instrument for the recognition of the species of the genus *Etmopterus*.

MATERIALS AND METHODS

In the beginning of 2000, four small specimens of velvet belly were acquired at the fish market in Milano, Italy, where they had been transported following their capture at Viareggio (Ligurian Sea, Italy) (Fig. 2). The four captured *E. spinax* were examined, and complete morphometric measurements made following Compagno (1984), adding D1S (first dorsal spine length) and D2S (second dorsal spine length). The specimens were preserved in 70% ethyl alcohol.

RESULTS

The lengths of these small sharks, two females and two males, were 108 mm, 110 mm, 142 mm and 153 mm, respectively. Their coloration presented no particular differences from that observable in adults of this species, and was similar in all four specimens. The dorsal surface was brown, while the ventral surface was largely black (from the underside of the snout to the pelvic region), with a narrow pale stripe on the side of the head behind the mouth. Conspicuous black marks were present even on dorsal anterior and inner margins, upper and lower caudal lobe, caudal peduncle, and anal fins. All posterior fin margins were white-edged and indented. The upper teeth had cusplets considerably smaller than in adults of the species. Complete morphometric measurements of the four specimens are presented in table 1.

DISCUSSION

The small size of the four specimens examined clearly indicated they were neonates. Lengths of two of the specimens were 10 and 12 mm less than the minimum size at birth indicated by Compagno (1984), supporting Vacchi & Relini Orsi (1979), Bauchot (1987) and Barrull *et al.* (1999) observations, indicating that the size at birth of *E. spinax* is between 100 and 110 mm.

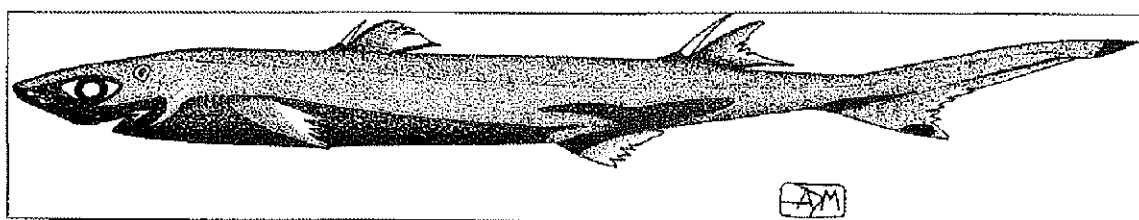


Fig. 1: Neonate velvet belly, *Etmopterus spinax* (Linnaeus, 1758). (Drawing by A. De Maddalena)
Sl. 1: Novoskoteni črni trnez *Etmopterus spinax* (Linnaeus, 1758). (Risba: A. De Maddalena)

During 1999-2000, at least 10 other neonates of this species had been transported to the fish market in Milano, following capture at the same locality, Viareggio. It appears that the region near Viareggio may be a nursery area for the velvet belly, which is in accord with observations made by Vacchi & Relini Orsi (1979) regarding the importance of the Ligurian Sea for reproduction of this species. That no adult female velvet belly has been collected from this region can be explained by the fact that this species is not retained by commercial fishermen. It is very probable that adult *E. spinax* are re-

leased after capture (as reported by Costa, 1991), while sometimes the neonates are casually transported to fish markets in crates containing other fishes.

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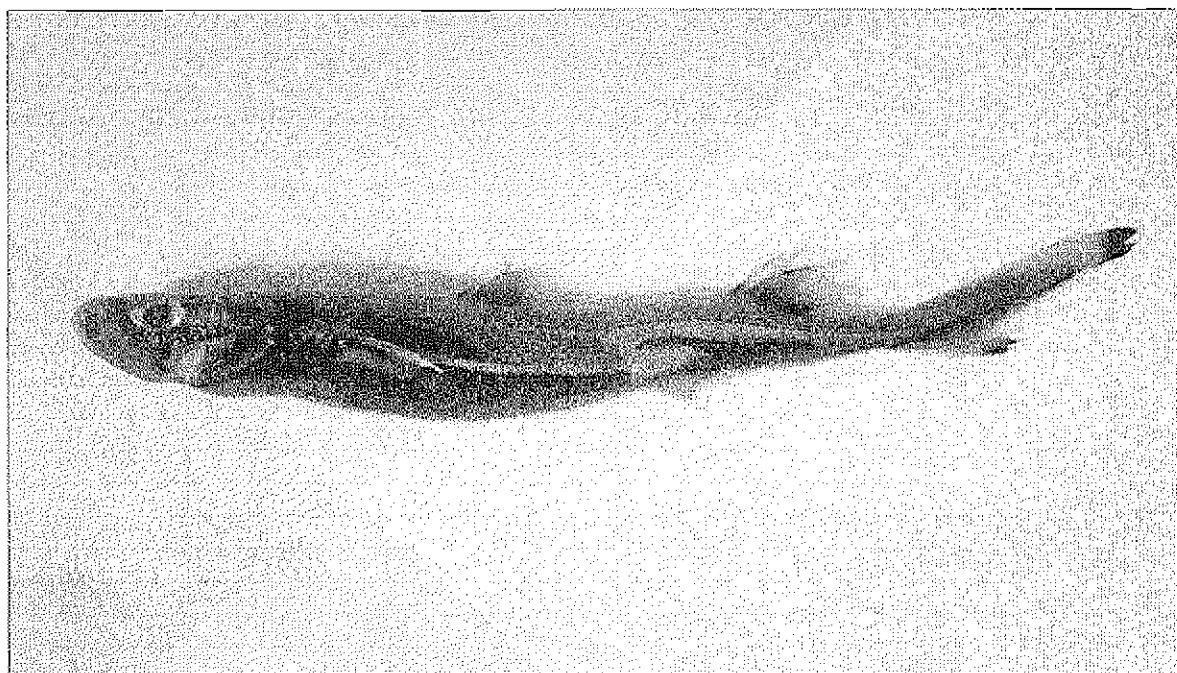


Fig. 2: Neonate velvet belly, *Etmopterus spinax* (Linnaeus, 1758), caught at Viareggio, Italy, in 2000. (Photo: L. Piscitelli)

Sl. 2: Novoskotení črni trnež *Etmopterus spinax* (Linnaeus, 1758), ujet leta 2000 v bližini Viareggia v Italiji. (Foto: L. Piscitelli)

Tab. 1: Morphometrics of the four neonate *Etmopterus spinax* (Linnaeus, 1758). All measurements are given in millimetres.

Tab. 1: Morfometrija štirih novoskotenih črnih trnežev *Etmopterus spinax* (Linné, 1758). Vse mere so v milimetrih.

Measurements	#1	#2	#3	#4	%TOT (mean)
TOT total length	108.0	110.0	142.0	153.0	100.00
FOR fork length	91.0	93.0	124.8	127.0	84.92
PRC precaudal length	81.0	85.0	104.5	119.0	75.91
PD2 pre-second dorsal length	62.0	62.0	86.0	89.0	58.12
PD1 pre-first dorsal length	34.0	36.0	51.0	48.0	34.12
HDL head length	24.0	26.0	33.5	38.0	23.57
PG1 prebranchial length	19.5	20.0	26.5	27.0	18.13
PSP prespiracular length	14.0	16.0	18.5	19.0	13.24
POB preorbital length	4.5	5.0	6.5	7.0	4.46
PPI prepectoral length	24.0	26.0	33.5	38.0	23.57

PP2 prepelvic length	56.0	57.0	74.0	77.0	51.53
SVL snout-vent length	61.0	61.0	79.0	83.0	55.45
IDS interdorsal space	20.5	20.0	27.4	32.5	19.42
DCS dorsal-caudalspace	9.5	12.8	15.0	20.0	11.02
PPS pectoral-pelvic space	18.0	24.5	35.0	38.0	22.11
PCA pelvic-caudal space	17.0	17.0	24.6	26.0	16.37
VCL vent-caudal length	47.0	49.0	63.0	70.0	44.54
PRN prenarial length	1.2	1.3	2.6	2.0	1.36
POR preoral length	9.7	13.0	12.5	15.0	9.85
EYL eye length	6.6	9.2	9.8	9.0	6.81
EYH eye height	4.4	3.8	3.0	5.20	3.26
INC intergill length	4.0	6.0	7.0	11.0	5.32
GS1 first gill slit height	2.5	1.8	3.5	3.0	2.09
GS2 second gill slit height	3.0	1.5	3.5	2.5	2.06
GS3 third gill slit height	3.0	1.5	3.5	2.5	2.06
GS4 fourth gill slit height	3.0	1.5	3.5	2.2	2.06
GS5 fifth gill slit height	2.5	1.5	3.0	2.0	1.85
P1A pectoral anterior margin	10.6	10.3	11.4	15.0	9.25
P1B pectoral base	4.0	6.0	7.0	8.0	4.83
P1I pectoral inner margin	6.0	7.0	6.0	9.0	5.50
P1P pectoral posterior margin	4.0	3.0	4.0	6.0	3.29
P1H pectoral height	7.0	9.0	15.0	18.0	9.24
CDM dorsal caudal margin	26.8	22.7	30.2	29.7	21.53
CPV preventral caudal margin	14.0	12.0	18.0	16.8	11.88
CPU upper postventral caudal margin	10.3	10.0	14.0	15.8	9.70
CPL lower postventral caudal margin	2.0	2.0	5.0	3.0	2.29
CFW caudal fork width	5.5	4.0	9.2	6.3	4.83
CFL caudal fork length	14.0	13.0	19.0	15.0	11.99
CSW subterminal caudal margin	2.6	1.9	5.0	2.9	2.39
CTL terminal caudal lobe	6.0	5.0	6.3	7.2	4.82
DTL first dorsal length	10.0	11.0	13.0	14.1	9.41
D1A first dorsal anterior margin	7.0	7.0	8.5	12.0	6.67
DTB first dorsal base	6.0	6.8	6.5	8.0	5.38
D1H first dorsal height	3.0	2.9	4.6	5.0	2.98
D1I first dorsal inner margin	4.0	4.2	6.5	6.1	4.02
D1P first dorsal posterior margin	2.0	4.0	6.0	2.5	2.83
D1S first dorsal spine	7.0	6.0	6.2	7.0	5.22
D2L second dorsal length	12.0	15.0	17.0	17.5	12.04
D2A second dorsal anterior margin	12.0	7.2	16.7	15.0	9.80
D2B second dorsal base	6.5	9.0	12.0	11.0	7.46
D2H second dorsal height	3.5	4.0	7.0	6.0	3.93
D2I second dorsal inner margin	5.5	6.0	5.0	6.5	4.11
D2P second dorsal posterior margin	4.0	3.0	8.0	4.0	3.67
D2S second dorsal spine	10.0	11.0	10.8	>5.0	8.98
P2L pelvic length	9.0	11.3	13.5	17.0	9.80
P2A pelvic anterior margin	7.0	5.0	7.0	10.0	5.62
P2B pelvic base	7.0	7.8	8.0	8.5	6.19
P2H pelvic height	3.5	2.5	4.5	4.5	2.90
P2I pelvic inner margin length	2.0	3.5	5.5	8.5	3.60
P2P pelvic posterior margin length	4.5	5.0	8.0	8.5	4.96
HDH head height	10.0	8.0	14.0	9.0	8.07
TRH trunk height	10.5	8.0	12.0	8.5	7.73

ABH abdomen height	9.8	7.0	11.0	11.0	7.59
TAH tail height	7.2	6.5	9.5	9.0	6.29
CPH caudal peduncle height	3.0	3.5	5.0	4.5	3.10
DPO 1 st dorsal midpt.-pelvic origin	13.0	15.0	18.0	20.0	12.86
PDI pelvic midpt.-1 st dorsal insertion	16.0	18.5	24.8	29.0	17.01
PDO pelvic midpt.-2 nd dorsal origin	4.0	1.5	2.6	2.5	2.13
MOL mouth length	3.5	3.8	4.0	4.0	3.03
MOW mouth width	8.0	9.0	9.0	10.0	7.12
NOW nostril width	3.5	2.8	4.0	3.8	2.77
INW internarial space	2.8	3.5	4.4	4.0	2.87
ANF anterior nasal flap length	0.7	1.2	1.0	1.1	0.79
CLO clasper outer length	X	X	2.0	2.0	1.36
CLI clasper inner length	X	X	6.0	7.5	4.56
CLB clasper base width	X	X	1.0	1.0	0.67
INO interorbital space	10.8	12.0	13.0	13.2	9.67
SPL spiracle length	1.3	1.3	1.5	2.5	1.27
ESL eye spiracle space	2.2	1.0	2.0	1.5	1.33
HDW head width	13.0	14.0	17.0	18.0	12.12
TRW trunk width	9.5	9.0	12.0	12.0	8.32
ABW abdomen width	7.5	7.0	10.5	11.0	6.97
TAW tail width	5.0	3.5	7.0	7.0	4.33
CPW caudal peduncle width	2.3	2.2	3.0	2.6	1.98

MORFOMETRIJA NOVOSKOTENIH ČRNIH TRNEŽEV *ETMOPTERUS SPINAX* (LINNAEUS, 1758)

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POVZETEK

Avtorja navajata biološke podatke o štirih novoskotenih črnih trnežih *Etmopterus spinax* (Linnaeus, 1758), ujetih v začetku leta 2000 v bližini Viareggia (Ligursko morje). Osebk (dva samca in dve samici) so bili dolgi 108, 110, 142 in 153 mm. Predstavljena je morfometrija vseh štirih trnežev. Avtorja sklepata, da je ta del morja v bližini Viareggia razmnoževalno okolje za to vrsto morskega psa.

Ključne besede: črni trnež, *Etmopterus spinax*, razmnoževanje, Ligursko morje

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