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FIRST CONFIRMED RECORD OF ANGULAR ROUGHSHARK *OXYNOTUS CENTRINA* (LINNAEUS, 1758) PREDATION ON SHARK EGG CASE OF SMALL-SPOTTED CATSHARK *SCYLIORHINUS CANICULA* (LINNAEUS, 1758) IN MEDITERRANEAN WATERS

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ABSTRACT

The stomach content examination of two male angular roughshark individuals Oxynotus centrina *captured in Barcelona's coastal waters on November 2000 and January 2001 revealed the presence of yolk sacks and embryos from the small-spotted catshark* Scyliorhinus canicula. *Up to date, this is the first confirmed record of small-spotted catshark egg predation in the Mediterranean waters.*

Key words: *Oxynotus centrina, Scyliorhinus canicula,* predation, shark egg case, embryos, Mediterranean Sea

PRIMA SEGNALAZIONE CONFERMATA DI PREDAZIONE DI PESCE PORCO *OXYNOTUS CENTRINA* (LINNAEUS, 1758) SU CAPSULE OVARICHE DI GATTUCCI MINORI *SCYLIORHINUS CANICULA* (LINNAEUS, 1758) IN ACQUE MEDITERRANEE

SINTESI

L'esame del contenuto stomacale di due maschi di pesce porco Oxynotus centrina *(Linnaeus, 1758) catturati davanti al litorale di Barcellona nel novembre 2000 e nel gennaio 2001, ha rilevato la presenza di sacchi vitellini ed embrioni appartenenti alla specie dei gattucci minori* Scyliorhinus canicula *(Linnaeus, 1758). Per quanto è noto, si tratta della prima segnalazione confermata di predazione su capsule ovariche di gattucci minori in acque mediterranee.*

Parole chiave: *Oxynotus centrina, Scyliorhinus canicula,* predazione, capsula ovarica, embrioni, Mare Mediterraneo

INTRODUCTION

Records of predation on elasmobranch eggs are relatively rare (Cox & Koob, 1993). In this report we discuss the first confirmed record of elasmobranch predation on embryos of an oviparous shark in Mediterranean waters.

MATERIAL AND METHODS

Two angular roughshark *Oxynotus centrina* (Linnaeus, 1758) male individuals (Figs. 1, 2) were caught in Catalonia's continental slope waters on November 10th 2000 and January 2nd 2001 by the fishing vessel "Maireta II" based in the port of Barcelona (Spain). The specimens were caught using a trawler net at a depth of 192 m in the fishing ground know as "La Serola", at a geographical position of 41°12' N, 2°28' E (Fig 3). The specimens were identified according to Compagno (1984a). They were deposited at the Ichthyological Collection of the Zoology Museum of Barcelona, with catalogue numbers MZB-2000-1035 and MZB-2001-0006. The roughshark were examined for parasites. Stomachs were dissected and the contents identified. The reproductive tracts of individuals were examined to determine maturity in agreement with Moreno & Hoyos (1982).

RESULTS AND DISCUSSION

The two angular roughshark *O. centrina* male individuals measured both 555 mm total length. In table 1 the main morphometric data of specimens are presented following Compagno (1984a). Both were immature, and no internal or external parasites were found. The examination of one of the angular roughshark's stomach content revealed only fragments of ten yolk sacks and one 34 mm (total length) embryo (Fig. 4). The embryo, which had an external yolk sack, was determined to belong to the small-spotted catshark *Scyliorhinus canicula*, which was in agreement with the illustrations and morphological descriptions provided in Compagno (1984b), Moreno (1995) and Van Grevelynghe *et al.* (1999). The stomach content of the second shark showed two embryos at a total length of 60 mm from *Scyliorhinus canicula* (Fig. 5). No egg capsules were found. The egg content might have been sucked up by the angular roughshark.

Very little is known about the angular roughshark's diet. It is a solitary animal. However, two specimens are sometimes captured at the same time. Angular roughshark inhabits mud and sand-bottoms at depths of about 50-725 m (Barrull *et al.*, 1999) and it is thought that its diet consists of polychaetes and small animals from marine bottom (Compagno, 1984a; Barrull & Mate, 1996). Capapé (1975) points out that in Tunisian waters it feeds on crustaceans. Some species of carnivorous gastropods may drill into and feed on embryos, or developing its own young, in egg cases of some oviparous sharks (Mc Laughlin & O'Gower, 1971; Cox & Koob, 1993). Shark egg cases have been taken from stomachs of teleost (Long, 1996), marine mammals (Morejohn & Baltz, 1970; Jones, 1981; Condit & Le Boeuf, 1984; Antonelis *et al.*, 1987; Sinclair, 1994) and at least one species of shark (Grover, 1972). The fact that this is the first confirmed record of elasmobranches predation on shark eggs in Mediterranean waters provokes a special interest. Firstly because it reveals something new about

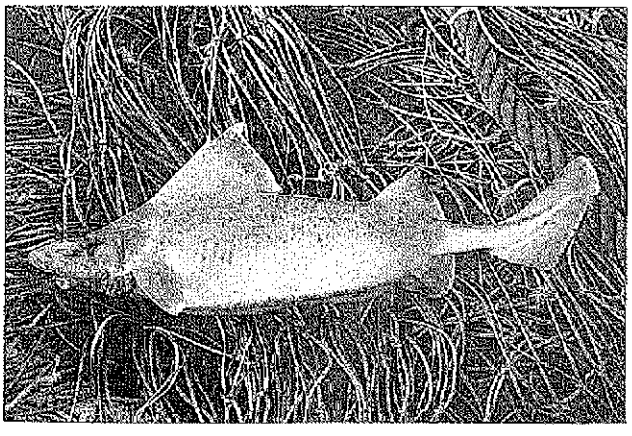

Fig. 1: Angular roughshark** Oxynotus centrina **caught on November 10th 2000 in coastal waters off Barcelona. (Photo: J. Barrull & I. Mate)
Sl. 1: Morski prašič** Oxynotus centrina, **ujet 10. novembra 2000 nedaleč od Barcelone. (Foto: J. Barrull & I. Mate)

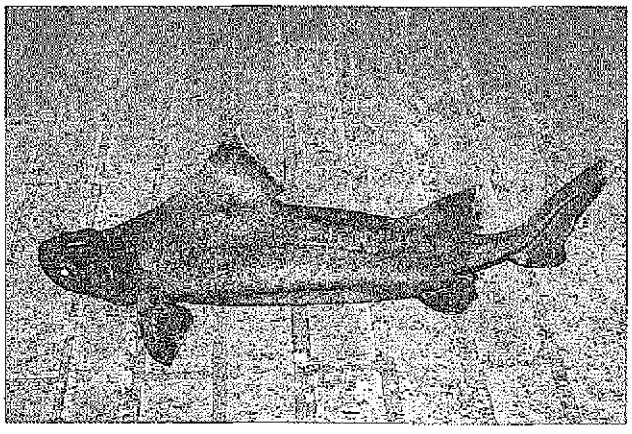

Fig. 2: Angular roughshark** Oxynotus centrina **caught on January 2nd 2001 in coastal waters off Barcelona. (Photo: J. Barrull & I. Mate)
Sl. 2: Morski prašič** Oxynotus centrina, **ujet 2. januarja 2001 nedaleč od Barcelone. (Foto: J. Barrull & I. Mate)

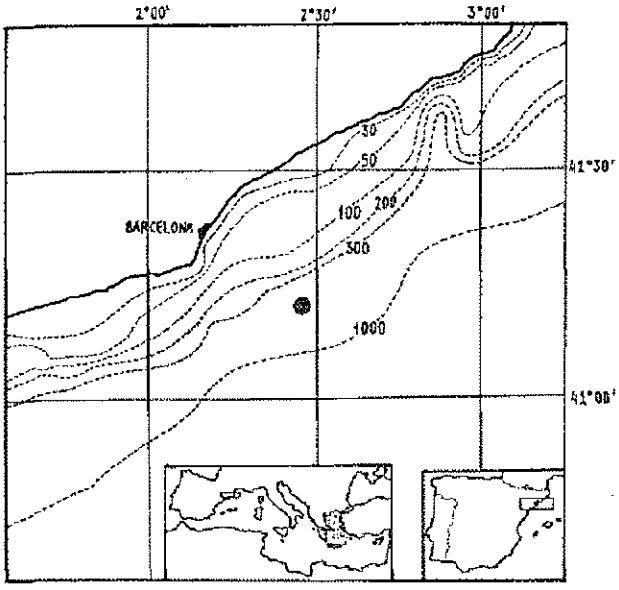

Fig. 3: Localization of the specimens of Angular roughshark** Oxynotus centrina **in the Barcelona littoral (NW Mediterranean).
Sl. 3: Lokacija osebkov morskega prašiča** Oxynotus centrina **v barcelonskem obrežnem pasu (SZ Sredozemsko morje).

angular roughshark's diet, and secondly for the consequences that this predation may have on species whose eggs are eaten.

The records of shark egg cases in stomachs of marine animals are rare (Cox & Koob, 1993). The question is how often this predation occurs. Small-spotted catshark eggs can be an important nutritional source, due to their high fat and protein content, and their accessibility. It is also important to point out that small-spotted catsharks and angular roughsharks have a similar bathymetrical distribution in almost all the continental slope and at different depths (Barrull *et al.*, 1999). So, this kind of interaction would not be surprising.

It would be worth finding out how this predation could affect the small-spotted catshark population. Angular roughsharks are considered an unusual and not a very prolific shark, due to their year-long reproductive period, with litters between 8 and 23 young (Capapé *et al.*, 1999, 2000), while the small spotted cat shark is considered an abundant and very prolific species. Also with a year reproductive period (with seasonal fluctuations), can produce between 96-115 egg cases each year (Capapé, 1977). Considering all these facts, we assume that angular roughshark's predation on the small-spotted catshark's eggs will not threaten its population. It would be necessary, however, to acquire more documentation to adequately analyse this phenomena.

The fact that this may be the first accurately documented instance of elasmobranch predation on embryos of an oviparous shark in Mediterranean waters, should warrant the special interest.

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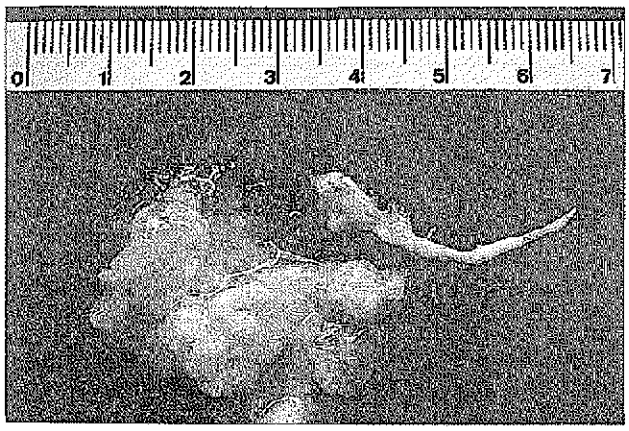

Fig. 4: Fragments of yolk sacks and 34 mm small-spotted catshark embryo from the stomach content of the November specimen. (Photo: J. Barrull & I. Mate)
Sl. 4: Delci rumenjakovih vrečk in 34 mm dolgega zarodka morske mačke iz želodca v novembru ujetega morskega prašiča. (Foto: J. Barrull & I. Mate)

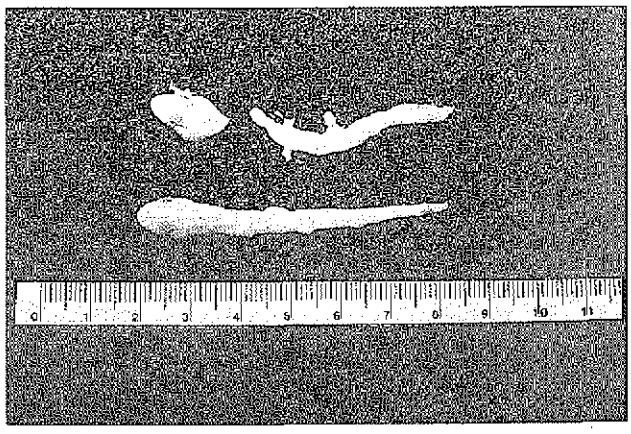

Fig. 5: 60 mm small-spotted catshark embryos from the stomach content of the January specimen. (Photo: J. Barrull & I. Mate)
Sl. 5: 60 mm dolgi zarodki morske mačke iz želodca v januarju ujetega morskega prašiča. (Foto: J. Barrull & I. Mate)

Tab. 1: Proportional dimensions of the two angular roughsharks caught off Barcelona.
Tab. 1: Proporcionalne dimenzije dveh morskih prašičev, ujetih v obrežnih vodah Barcelone.

		MZB-2000-1035	MZB-2001-0006
		Sex (M)	*Sex (M)*
total length (mm)	**TL**	555	555
precaudal length	**PRC**	79.8	80.2
pre-first dorsal length	**PD1**	19.4	19.1
pre-second dorsal length	**PD2**	58.4	57.9
first dorsal length	**D1L**	25.2	22.9
second dorsal length	**D2L**	14.8	14.9
first dorsal base	**D1B**	20.9	18.9
second dorsal base	**D2B**	11.7	10.4
first dorsal inner margin	**D1I**	4.3	4.0
second dorsal inner margin	**D2I**	3.1	4.5
first dorsal height	**D1H**	12.1	12.6
second dorsal height	**D2H**	10.3	10.6
first spine length	**S1**	11.0	13.1
second spine length	**S2**	8.8	7.4
dorsal caudal margin	**CDM**	20.7	20.4
preventral caudal margin	**CPV**	12.1	11.3
terminal caudal lobe	**CTL**	6.5	6.7
prepectoral length	**PP1**	18.6	18.5
pectoral anterior margin	**P1A**	15.5	16.0
pectoral posterior margin	**P1P**	14.4	14.0
pectoral base	**P1B**	5.8	4.9
pectoral inner margin	**P1I**	2.5	4.5
prepelvic length	**PP2**	62.2	60.9
pelvic length	**P2L**	10.1	10.8
pelvic anterior margin	**P2A**	6.7	6.1
clasper outer length	**CLO**	1.1	1.3
clasper inner length	**CLI**	5.9	6.1
mouth width	**MOW**	4.6	4.2
preoral length	**POR**	4.0	5.4
nostril width	**NOW**	2.2	3.4
internarial space	**INW**	1.1	2.5
prenarial length	**PRN**	2.0	3.6
prespiracular length	**PSP**	9.4	9.9
preorbital length	**POB**	4.3	7.7
eye length	**EYL**	4.3	3.8
eye height	**EYH**	2.1	2.0
intergill length	**ING**	4.0	5.1
first gill slit height	**GS1**	1.3	1.7
fifth gill slit height	**GS5**	1.5	1.5

PRVI POTRJENI PRIMER OPLENJENEGA JAJČNEGA OVOJA MORSKE MAČKE *SCYLIORHINUS CANICULA* V TREBUHU MORSKEGA PRAŠIČA *OXYNOTUS CENTRINA* (LINNAEUS, 1758) V SREDOZEMSKEM MORJU

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POVZETEK

Podatki o plenjenju jajčec morskih psov in skatov so razmeroma redki. Nekatere vrste mesojedih polžev lahko vrtajo v zarodke (in se hranijo z njimi) ali vzrejajo zarod v kapsulah oviparnih morskih psov. Jajčni ovoji sami pa so bili najdeni v želodcih pravih kostnic, morskih sesalcev in v najmanj eni vrsti živorodnega morskega psa. V tem prispevku avtorja razpravljata o bržkone prvem potrjenem primeru plenjenja zarodkov oviparnega morskega psa v vodah Sredozemskega morja. Dne 10. novembra 2000 in 2. januarja 2001 sta bila z vlečno mrežo ribiške ladje "Maireta II" (z matičnim pristaniščem v Barceloni) ujeta dva 550 mm dolga samca morskega prašiča Oxynotus centrina *(Linnaeus, 1758) v vodah celinskega pobočja nedaleč od katalonskega obrežja. Ujeta sta bila v globini 192 metrov na ribiški lokaciji, znani kot "La Serola", in sicer 41°12' N, 2°28' E. Oba samca sta bila izročena Zoološkemu muzeju v Barceloni in označena s katalоškima številkama MZB-2000-1035 in MZB-2001-0006. Pregled želodca enega od morskih prašičev je razkril delce desetih rumenjakovih vrečk in enega zarodka v skupni dolžini 34 mm. Na osnovi primerjav z ilustracijami in morfološkimi opisi Compagna (1984a), Morena (1995) in Van Grevelyngheja* et al. *(1999) je bilo ugotovljeno, da je zarodek, z zunanjo rumenjakovo vrečko, pripadal morski mački* Scyliorhinus canicula *(Linnaeus, 1758). V želodcu drugega morskega prašiča pa sta bila odkrita dva zarodka morske mačke* Scyliorhinus canicula *v skupni dolžini 60 mm. Jajčnih ovojev ni bilo, in prav mogoče je, da je morski prašič jajčno vsebino izsesal.*

Ta primer bo bržkone pritegnil še nadaljnje zanimanje strokovnjakov, saj je prvi natančno dokumentirani zapis o morskih psih (Elasmobranchii) z uplenjenimi zarodki oviparnega morskega psa v vodah Sredozemskega morja.

Ključne besede: *Oxynotus centrina, Scyliorhinus canicula,* predatorstvo, jajčni ovoj, zarodki, Sredozemsko morje

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