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STOMACH CONTENTS OF THE LONGNOSE SPURDOG, *SQUALUS BLAINVILLEI* (RISSO, 1826) FROM THE NORTH-EASTERN AEGEAN SEA

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ABSTRACT

Examination of the stomach contents of the longnose spurdogs, *Squalus blainvillei* (Risso, 1826), captured in the NE Aegean Sea suggests that they mainly consumed, in order of importance, crustaceans and teleost fishes (I.R.I. = 7098.59 and 2734.8, respectively). *Liocarcinus* spp. and *Parapenaeus longirostris* were the most frequent prey items of the examined specimens of longnose spurdogs (I.R.I. = 2072.74 and 1143.2, respectively).

Key words: Squalidae, longnose spurdog, *Squalus blainvillei*, stomach contents, Aegean Sea

CONTENUTI STOMACALI DELLO SPINAROLO BRUNO, *SQUALUS BLAINVILLEI* (RISSO, 1826) DELL'EGEO NORD-ORIENTALE

SINTESI

L'esame dei contenuti stomacali di spinarolo bruno, *Squalus blainvillei* (Risso, 1826), catturato nell'Egeo nord-orientale, suggerisce che la sua alimentazione si basi, in ordine di importanza, su crostacei e teleostei (I.R.I. = 7098.59 e 2734.8, rispettivamente). *Liocarcinus* spp. e *Parapenaeus longirostris* sono risultati le prede più frequenti degli esemplari esaminati di spinarolo bruno (I.R.I. = 2072.74 e 1143.2, rispettivamente).

Parole chiave: Squalidae, spinarolo bruno, *Squalus blainvillei*, contenuti stomacali, mar Egeo

INTRODUCTION

The longnose spurdog, *Squalus blainvillei* (Risso, 1826) (Fig. 1) is a widespread member of the family Squalidae and it generally occurs at depths between 16 and 440 m (Compagno, 1984). The occurrence of this shark in the Mediterranean Sea as well as along the Turkish coast is well documented by several researchers (e.g., Akşiray, 1987; Kabasakal, 2002a, *in press*; McEachran & Branstetter, 1984; Slastenenko, 1955-1956; and Tortonese, 1956).

Elasmobranchs are among the top predators in the marine environment and have an important role in the marine ecosystem in relation to the populations of both fish and invertebrates at lower trophic levels (Ellis *et al.*, 1996). Furthermore, there is always a competition between the fishermen and the marine predators feeding on commercially valuable species, and the interactions among these predators and the populations of commercially important marine species should therefore be carefully examined (Kabasakal, 2002b, *in press*). There have been several studies describing the stomach contents of the squaliform sharks of a specific area in the Mediterranean Sea, for example, Jardas (1972a, 1972b) in the Adriatic Sea, Kabasakal & Ünsal (1999) and Karaçam *et al.* (1996) in Turkish seas, and Macpherson (1980) in the western Mediterranean.

The aim of the present study is to provide some preliminary data on the stomach contents of *S. blainvillei*, captured in the NE Aegean Sea.

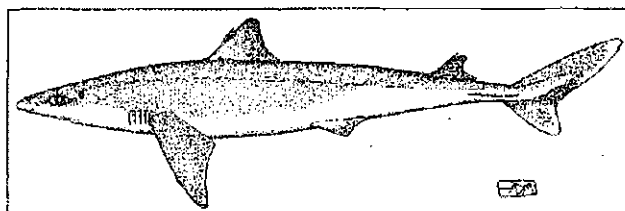


Fig. 1: Longnose spurdog, *Squalus blainvillei* (Risso, 1826). (Drawing: A. De Maddalena)
Sl. 1: Rjavi trnež, *Squalus blainvillei* (Risso, 1826). (Risba: A. De Maddalena)

MATERIAL AND METHODS

In November 2000, specimens of *S. blainvillei* were collected by means of a commercial fishing trawler with a cod-end mesh opening of 22 mm from knot to knot, in the NE Aegean Sea (Station 1: 40°28' N - 26°00' E, depth = 80 m, n = 20; Station 2: 40°33' N - 25°59' E, depth = 70 m, n = 25; Fig. 2). All haulings were carried out during the day time. Total length (TOT; according to Compagno, 1984) of the sharks was measured to the nearest mm with a measuring tape. Total lengths of the examined sharks ranged between 350 to 420 mm. Di-

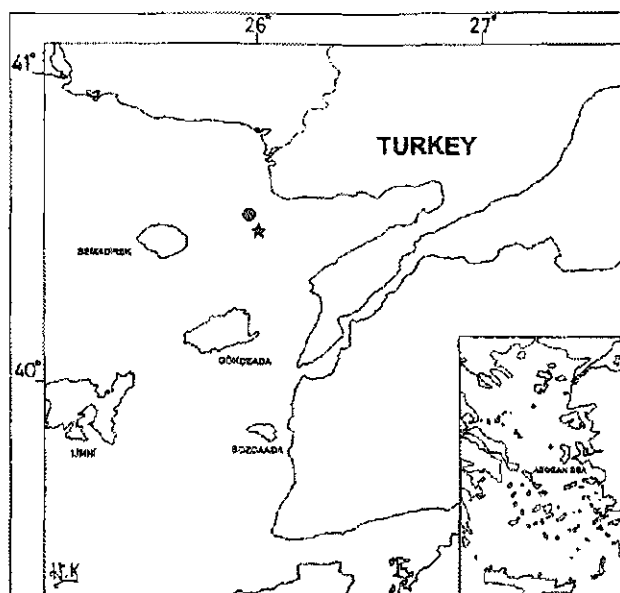


Fig. 2: Sampling stations in the north-eastern Aegean Sea (*, indicates St. 1 and ◉, indicates St. 2); (⇒) on the small map indicates the area investigated.

Sl. 2: Vzorčišča v severovzhodnem Egejskem morju (* ponazarja 1. vzorčišče, ◉ 2. vzorčišče); (⇒) na malem zemljevidu označuje raziskovano območje.

gestive tracts of the specimens were removed and immediately fixed in 5 percent formalin in sea water. The fixed stomach contents were finally preserved in 70% ethanol. Prey items found in the stomachs were identified to the possible lowest taxon. Preys were dried on the paper towel at room temperature for one hour, weighed to the nearest 0.05 g on precision balance and then counted. Percent numerical (PN%), weight (PW%) and frequency of occurrence (PO%) values of prey items were calculated, and these values were used to calculate the Index of Relative Importance "I.R.I." of each prey item, according to the following formulae (Cailliet *et al.*, 1986):

$$\text{I.R.I.} = (\text{PN}\% + \text{PW}\%) \times \text{PO}\%$$

According to Cailliet *et al.* (1986), the maximum value of I.R.I. would be 20000. The number of fish with empty stomachs was expressed as a percentage of the total number examined (the Index of Vacuity, IV; Ellis *et al.* 1996).

RESULTS AND DISCUSSION

The aim of the stomach content analysis is to provide information on the contribution of different prey to the diet, indicating the position of a fish within the general trophic web. Thirty-three (73.3%) of the 45 examined stomachs of *S. blainvillei* were found to contain food (IV = 26.6%). Dietary composition of full stomachs is summarised in Table 1 and graphically expressed in Fig. 3.

Tab. 1: Composition of the stomach contents of the examined specimens of *Squalus blainvillei*, and numerical (PN%), weight (PW%), and frequency of occurrence (PO%) values of prey items.

Tab. 1: Struktura hrane v želodcih pregledanih primerkov rjavih trnežev *Squalus blainvillei* in vrednosti, kar zadeva številčnost (PN%), težo (PW%) in frekvenco pojavljanja (PO%) enot plena.

PREY	PN%	PW%	PO%	I.R.I.
ELASMOBRANCHII				
<i>Scyliorhinus canicula</i>	0.16	1.61	3.03	5.37
TELEOSTEI				
<i>Sardina pilchardus</i>	0.33	4.55	3.03	14.8
<i>Engraulis encrasicolus</i>	0.66	0.79	9.09	13.26
<i>Mullus surmuletus</i>	0.33	3.94	6.06	25.92
<i>Cepola rubescens</i>	0.33	2.75	6.06	18.69
Gobiidae spp.	0.33	1.25	3.03	4.81
Unidentified teleost remains	18.84	14.89	90.9	3067.09
Total Teleostei	20.82	9.25	90.9	2734.8
CRUSTACEA				
<i>Parapenaeus longirostris</i>	5.12	8.34	64.64	1143.2
<i>Liocarcinus</i> spp.	6.61	14.76	96.96	2072.74
<i>Goneplax rhomboides</i>	1.32	1.41	18.18	49.79
Unidentified crustacean remains	44.95	14.96	100	5992.27
Total Crustacea	58.01	12.96	100	7098.59
CEPHALOPODA				
<i>Sepia elegans</i>	1.98	16.39	24.24	445.57
Unidentified cephalopod remains	0.66	6.57	6.06	43.83
Total Cephalopoda	2.64	7.54	30.3	308.79
POLYCHAETA				
<i>Euphrosine foliosa</i>	0.49	0.72	6.06	7.38
Unidentified tissues	17.85	5.68	100	2353.58
Total weight of food items (g)	304.33			
Total number of food items	605			

The data in this study suggest that *S. blainvillei* mainly consumed, in order of importance, crustaceans and teleost fishes (I.R.I. = 7098.59 and 2734.8, respectively, Tab. 1). Crustaceans were found in all of the examined stomachs and the epibenthic decapods consisted the major part of the identified crustaceans. *Liocarcinus* spp. and *Parapenaeus longirostris* were the most frequent prey items of the examined specimens of longnose spurdog (I.R.I. = 2072.74 and 1143.2, respectively, Tab. 1 and Fig. 3). Regarding its I.R.I. value, *Sepia elegans* occupies the third rank (I.R.I. = 445.57) after *Liocarcinus* spp. and *Parapenaeus longirostris*. In comparison with the most frequent prey organisms, I.R.I. values of the polychaete, *Euphrosine foliosa*, and the lesser spotted catshark, *Scyliorhinus canicula*, were remarkably lower (I.R.I. = 7.38 and 5.37, respectively, Tab. 1 and Fig. 3), and in the light of this result, both animals can be considered as accidental preys of *S. blainvillei*.

Jardas (1972a) examined 43 Adriatic specimens of *S.*

blainvillei and recorded three species of benthic and epibenthic teleost fishes, five species of crustaceans and four species of cephalopods in the stomachs. Jardas (1972a) also reported that *S. blainvillei* has a preference for Cephalopoda and Crustacea in its diet. However, in the present study, by contrast, cephalopods occupy the third rank (I.R.I. = 308.79, Tab. 1) after crustaceans and teleost fishes.

Predation on the eggs and juveniles of the scyliorhinids by squaliform sharks has been well documented in some species (Barrull & Mate, 2001, in *Oxynotus centrina*; and Macpherson, 1980, in *Dalatias licha*). The continental shelf and slope of the northern Aegean Sea is recognized as a breeding and nursery ground for several elasmobranchs, including scyliorhinids by D'Onghia et al. (1995) and Kabasakal (2002a, in press). Because of their high fat and protein content as well as the easy accessibility, cat shark eggs and neonates can be an important nutritional source for bottom-dwelling sharks. It would be worth finding out how this predation by squaliform sharks could affect the catshark population over this nursery ground.

Although preliminary, the analysis of the stomach contents of *S. blainvillei* indicates that the longnose spurdog is a generalist predator feeding mainly on crustaceans and teleost fishes, as well as cephalopods and polychaetes.

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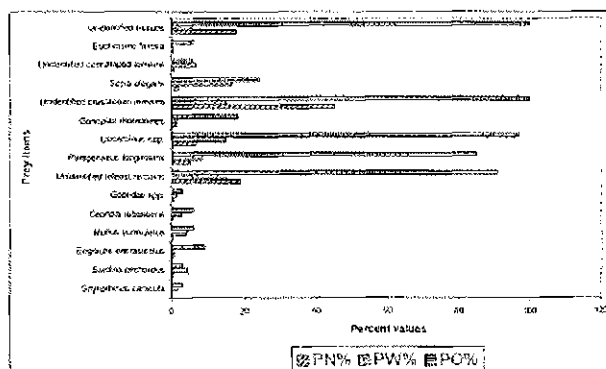


Fig. 3: I.R.I. diagram of the prey items and their numerical (PN%), weight (PW%), and frequency of occurrence (PO%) values.

Sl. 3: Diagram I.R.I. (Index of Relevant Importance) enot plena in vrednosti, kar zadeva številčnost (PN%), težo (PW%) in frekvenco pojavljanja (PO%) plena.

STRUKTURA HRANE V ŽELODCIH RJAVIH TRNEŽEV, *SQUALUS BLAINVILLEI* (RISSO, 1826), IZ SEVEROVZHODNEGA EGEJSKEGA MORJA

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POVZETEK

Pregled strukture hrane v želodcih rjavih trnežev, *Squalus blainvillei* (Risso, 1826), ujetih v SV Egejskem morju, kaže, da so se hranili, glede na pomen hrane, predvsem z raki in pravimi kostnicami (I.R.I. = 7098.59 in 2734.8). *Liocarcinus* spp. in *Parapenaeus longirostris* sta bili najpogostejši enoti hrane v pregledanih primerkih rjavih trnežev (I.R.I. = 2072.74 in 1143.2).

Ključne besede: Squalidae, rjavi trnež, *Squalus blainvillei*, struktura hrane v želodcih, Egejsko morje

REFERENCES

- Akşiray, F. (1987):** Türkiye Deniz Bahıkları ve Tayin Anahtarı. 2nd Edition, Publications of the Istanbul University, no: 3490, 811 pp.
- Barrull, J. & I. Mate (2001):** 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. *Annales Ser. hist. nat.*, 11(1), 23-28.
- Cailliet, G. M., M. S. Love & A. W. Ebeling (1986):** Fishes: a field and laboratory manual on their structure, identification, and natural history. Wadsworth Publishing Company, Belmont, California, 194 pp.
- Compagno, L. J. V. (1984):** FAO species catalogue. Vol. 4. Sharks of the World. An annotated and illustrated catalogue of sharks species known to date. Part 1. Hexanchiformes to Lamniformes. *FAO Fish. Synop.*, 125(4), 1-249.
- D'Onghia, G., A. Matarrese, A. Tursi & L. Sion (1995):** Observations on the depth distribution pattern of the small-spotted catshark in the North Aegean Sea. *Journal of Fish Biology*, 47, 421-426.
- Ellis, J. R., M. G. Pawson, & S. E. Shackley (1996):** The comparative feeding ecology of six species of shark and four species of ray (Elasmobranchii) in the north-east Atlantic. *J. Mar. Biol. Ass. (UK)*, 76, 89-106.
- Jardas, I. (1972a):** Results of the stomach contents analysis of *Squalus fernandinus* Molina. *Acta Adriat.*, 14, 3-10.
- Jardas, I. (1972b):** Supplement to the knowledge of ecology of some Adriatic cartilaginous fishes (Chondrichthyes) with special reference to their nutrition. *Acta Adriat.*, 14, 1-60.
- Kabasakal, H. (2002a, in press):** Elasmobranch species of the seas of Turkey. *Annales Ser. hist. nat.*, 12(1).
- Kabasakal, H. (2002b, in press):** Cephalopods in the stomach contents of four elasmobranch species from the northern Aegean Sea. *Acta Adriat.*, 43.
- Kabasakal, H. & N. Ünsal (1999):** Observations on *Etmopterus spinax* (Pisces: Squalidae) from the north-eastern Aegean Sea. *Bilješke-Notes*, 81, 12 pp.
- Karaçam, H., İ. Okumuş, A. M. Feyzioğlu & N. Sivri (1996):** Research on the growth, reproduction, nutrition properties of the piked dogfish (*Squalus acanthias*) living in the eastern Black Sea. XIII. Ulusal Biyoloji Kongresi (National Congress on Biology), 17-20 September 1996, İstanbul, Book of Abstracts, pp. 62.
- Macpherson, E. (1980):** Régime alimentaire de *Galeus melastomus* Rafinesque, 1810, *Etmopterus spinax* (L., 1758) et *Scymnorhinus licha* (Bonnaterre, 1788) en Méditerranée occidentale. *Vie Milieu*, 30, 139-148.
- McEachran, J. D. & S. Branstetter (1984):** Squalidae. In: P. J. P. Whitehead, M. -L. Bauchot, J. -C. Hureau, J. Nielsen & E. Tortonese (Eds.). *Fishes of the North-eastern Atlantic and the Mediterranean*. Vol. 1, Paris, UNESCO, pp. 128-147.
- Slastenenko, E. P. (1955-1956):** The Fishes of the Black Sea Basin. Et ve Balık Kurumu Umum Müdürlüğü Yayınlarından, İstanbul, 711 pp.
- Tortonese, E. (1956):** Fauna d'Italia, Vol. 2. Leptocardia, Ciclostomata, Selachii. Calderini, Bologna, 334 pp.