ISSN: 0001-5113
AADRAY

ACTA ADRIAT.,
42 (2): 15-24, 2001

UDC: 597.3 (262.4)
591.5:591.13
Preliminary report

Preliminary data on the feeding ecology of some selachians from the north-eastern Aegean Sea

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The diets and comparative feeding ecologies of some selachians caught along the Turkish coast of northern Aegean Sea were determined for the first time. The diet of Scyliorhinus canicula *was composed of teleosteans, crustaceans, cephalopods and polychaetes.* Raja clavata *fed primarily on crustaceans, with the main prey items being* Parapenaeus longirostris, Liocarcinus *spp.*, Goneplax rhomboides, Xantho *spp. and* Munida *spp. Teleosts and cephalopods were also consumed by the thornback ray.*

Key words: feeding ecology, dietary diversity, overlap, elasmobranchs, Aegean Sea

INTRODUCTION

Fishes may partition their environment by occupying different habitats, by feeding on different preys, and by utilising either of those resources at different stages in their life cycles (CROWDER, 1990; PLATELL *et al.*, 1998). Food-habit studies can contribute to an understanding of the interactions between members of a fish community. 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). Nevertheless, there have been few comparative studies on the feeding ecology of elasmobranchs. There have been several studies describing the stomach contents of *Scyliorhinus canicula* and *Raja clavata* of the specific area in the Mediterranean Sea, for example JARDAS (1972, 1979) in the Adriatic Sea, and CAPAPÉ (1974, 1975) in Tunisian waters. However, during the last decades food-habit studies of elasmobranchs are focused on either resource partitioning and feeding ecology of sharks and rays (MACPHERSON, 1980; AJAYI, 1982; ELLIS *et al.*, 1996; PLATELL *et al.*, 1998), or the predation of marine fauna by elasmobranchs (HARRIS *et al.*, 1988; GRAY *et al.*, 1997).

Scarcity of the studies on food and feeding habits of elasmobranchs occurring in the seas of Turkey is obvious. The present paper describes the diets of smallspotted cat shark, *Scyliorhinus canicula* (LINNAEUS, 1758) (Family Scyliorhinidae) and thornback ray, *Raja* (*Raja*) *clavata* LINNAEUS, 1758 (Family Rajidae), at a preliminary level. The breadth of the diet of each species and the overlap between them have been calculated.

MATERIAL AND METHODS

Samples of sharks and rays were collected by means of a commercial otter trawler with a cod-end mesh opening of 22 mm from knot to

knot, between March 1997 and April 1999, in the north-eastern Aegean Sea (Fig. 1). The total length (*TL*) was measured to the nearest 0.5 centimetre for all fish. The data for the two species

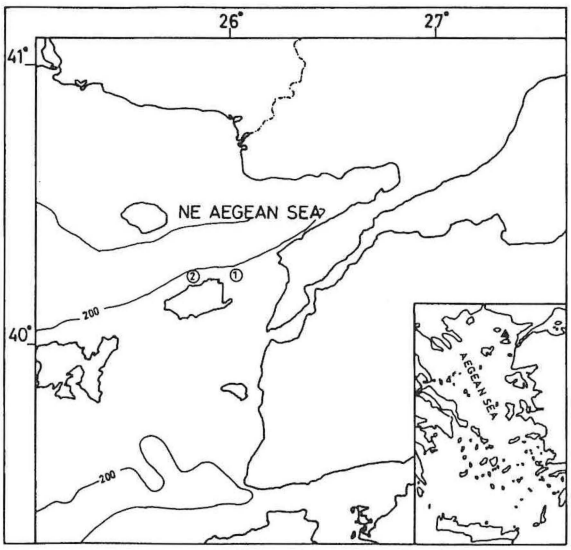

Fig. 1. Sampling stations in the north-eastern Aegean Sea. Dark triangle in the small map indicates the area investigated. St. 1: 40°14'13" N; 26°01'19" E (85 m) and St. 2: 40°15'12" N; 25°49'36" E (105 m)

were subdivided into two arbitrary size groups; *S. canicula* (< 30 cm and > 30 cm) and *R. clavata* (< 50 cm and > 50 cm). Total number of the examined specimens are given in Table 1.

Stomach contents of each fish were identified and counted to the lowest possible taxon. In the present study, a significant amount of teleosts and cephalopods represented by their hardparts, e. g. otoliths of teleosts or beaks of cephalopods. Therefore, those specimens could not be accurately weighed, and because of this reason percent by weight (*PW*) of each prey organism were not used in this study. Percent of total prey number of each prey organism (*PN*) and percent frequency occurrence of each prey organism (*PO*) were calculated according to CAILLIET *et al.* (1986). Further dietary analysis (dietary diversity and diet overlap) are based on *PO* values. Unidentifiable food remains or food remains identified only to a higher taxon than the prey group (e. g. unidentified cephalopods) were excluded from further analysis. The number of fish of each species with empty stomachs was expressed as a percentage of the total number examined (the Index of Vacuity, IV) (ELLIS *et al.*, 1996).

In order to compare the diets between the elasmobranch species, food items were allocated to 26 distinct prey groups, based on taxonomic and ecological criteria. These statistics (Table 3) were used in the subsequent evaluation of dietary diversity and dietary overlap.

The species diversity in the diet, which corresponds to dietary breadth was calculated for each species using the SHANNON-WIENER index (*H*) with the following formulae (CAILLIET *et al.*, 1986):

$$H = -\sum_{i=1}^{S} (Pi) \ln (pi),$$

where *Pi* is the proportion of each prey group in the diet represented by its percent frequency occurrence (*PO*).

The SCHOENER's Index (*Cxy*) was used to quantify dietary overlap. This is a symmetrical comparison and is calculated using the following formulae (CROWDER, 1990):

$$Cxy = 1\text{-}0.5\ (\sum |\, Pxi - Pyi \,|),$$

where *Pxi* is the proportion of prey group *i* used by species *x* and *Pyi* is the proportion of prey group *i* used by species *y*.

RESULTS

Diets of individual species

The diet of *Scyliorhinus canicula* (Table 1) was composed of teleosts, crustaceans, cephalopods and polychaetes (*PO* values were 71%, 32%, 21% and 15%, respectively), and the IV was 13.6%. Most important teleosts were gadiforms (21.6%) (Table 3). Other important prey species were *Parapenaeus longirostris* (12%), *Liocarcinus* spp. (8%), *Goneplax rhomboides* (3.2%), and species of Sepioidea and Teuthoidea (12% and 8%, respectively) (Table 3). Smaller specimens (< 30 cm) of *S. canicula* found to consume more teleosts (73%) and

fewer crustaceans (27%) than larger size group (> 30 cm), which fed predominantly on teleosts (64%), crustaceans (26%) and cephalopods (26%) (Table 1). Larger size group consumed more polychaetes (17%) than smaller specimens (14%).

*Table 1. Diet of the smallspotted cat shark (*Scyliorhinus canicula*) and the thornback ray (*Raja clavata*)*

SPECIES	*S. canicula*						*R. clavata*					
Mean TL ± SD (range in mm)	283.15±89.14						493.18±161.65					
Size category	< 30 cm		> 30 cm		Total		< 50 cm		> 50 cm		Total	
No. examined	91		34		125		27		26		53	
No. with empty stomachs	12 (13.18%)		5 (14.7%)		17 (13.6%)		4 (14.8%)		-		4 (7.54%)	
PREY	PN	PO	PN	PO	PN	PO	PN	PO	PN	PO	PN	PO
POLYCHAETA												
Chaetopterus variopedatus	2.24	5	6.61	8	3.77	6.4	-	-	-	-	-	-
Euphrosine foliosa	1.34	3	2.47	5	2.03	4	-	-	-	-	-	-
Polychaeta (unidentified)	2.69	6	5.78	11	4.36	8	-	-	-	-	-	-
Total Polychaeta	6.27	14	14.87	17	10.17	15	-	-	-	-	-	-
CEPHALOPODA												
Sepia orbignyana	-	-	-	-	-	-	-	-	0.69	7	24	1
S. elegans	1.34	3	0.82	2	1.16	3.2	-	-	1.38	15	0.97	7
S. officinalis	0.44	1	0.82	2	0.58	1	0.78	3	-	-	24	1
Sepia spp.	0.89	2	-	-	0.58	1	-	-	0.34	3	0.48	3
Sepietta oweniana	0.44	1	1.65	5	0.87	2	-	-	-	-	-	-
Sepietta spp.	-	-	-	-	-	-	-	-	0.34	3	24	1
Sepiola robusta	-	-	0.82	2	0.29	8	-	-	-	-	-	-
Sepiolidae (unidentified)	1.34	3	-	-	0.87	2	-	-	-	-	-	-
Todarodes sagittatus	-	-	0.82	2	0.29	0.8	-	-	-	-	-	-
Todaropsis eblanae	0.44	1	0.82	2	0.58	1	-	-	-	-	-	-
Loligo vulgaris	-	-	1.65	5	0.58	1	-	-	0.34	3	24	1
Illex coindetii	1.79	4	0.82	2	1.45	4	-	-	0.34	3	24	1
Bathypolypus sponsalis	-	-	-	-	-	-	-	-	0.34	3	24	1
Cephalopoda (unidentified)	2.24	4	0.82	2	1.74	4	-	-	-	-	-	-
Total Cephalopoda	8.96	1.9	9.09	2.6	9.01	21	0.78	3	3.81	4.2	2.91	20
GASTROPODA												
Lunatia spp.	-	-	0.82	2	0.29	0.8	-	-	-	-	-	-

Table 1. cont'd

CRUSTACEA												
Isopoda												
Cirolana borealis	1.34	3	-	-	0.87	2	-	-	1.04	3	0.72	1
Rocinela dumerili	1.34	3	2.47	8	1.74	4	0.78	3	0.34	3	0.48	3
Euphausiacea (unidentified)	3.13	3	2.47	5	2.9	4	0.78	3	-	-	24	1
Amphipoda												
Gammaridea (unidentified)	-	-	-	-	-	-	1.57	7	-	-	0.48	3
Mysidacea (unidentified)	2.69	5	3.3	8	2.9	6	7.87	14	-	-	2.42	7
Thalassinoidea (unidentified)	0.44	1	-	-	0.29	0.8	-	-	-	-	-	-
Copepoda (unidentified)	-	-	-	-	-	-	1.57	3	-	-	0.48	1
Stomatopoda												
Squilla spp.	-	-	-	-	-	-	1.57	3	0.34	3	0.72	3
Decapoda												
Parapenaeus longirostris	2.69	6	9.09	0.23	4.94	12	22.04	48	20.83	73	20.63	58
Pandalidae (unidentified)	-	-	0.82	2	0.29	0.8	0.78	3	-	-	24	3
Penaeidae (unidentified)	5.38	9	7.43	14	6.39	11	0.78	3	0.34	3	0.48	3
Nephrops norvegicus	-	-	-	-	-	-	-	-	0.34	3	24	1
Paguridea (unidentified)	0.44	1	-	-	0.29	0.8	-	-	-	-	-	-
Munida rugosa	-	-	-	-	-	-	2.36	11	2.08	11	2.18	11
Munida spp.	-	-	-	-	-	-	-	-	0.69	3	0.48	1
Galatheidae (unidentified)	0.44	1	0.82	2	0.58	1	0.78	3	-	-	24	1
Goneplax rhomboides	1.79	3	1.65	2	1.74	3	5.51	14	5.55	34	5.58	24
Liocarcinus depurator	-	-	-	-	-	-	4.72	3	3.47	15	3.88	9
Liocarcinus spp.	5.38	7	4.13	8	4.94	8	7.08	22	11.45	61	9.95	39
Portunidae (unidentified)	1.34	3	3.3	2	1.74	4	-	-	-	-	-	-
Pilumnus spp.	-	-	-	-	-	-	1.57	3	-	-	0.48	1
Calappa granulata	-	-	-	-	-	-	0.78	3	0.34	3	0.48	3
Brachyura (unidentified)	4.48	5	8.26	17	5.81	8	13.38	22	12.15	42	12.62	32
Crustacea (unidentified)	1.79	3	0.82	2	1.45	4	4.72	7	-	-	1.45	3
Total Crustacea	32.73	27	44.62	47	36.91	32	88.18	77	66.31	96	72.57	88

Table 1. cont'd

PISCES												
Engraulis encrasicolus	1.79	3	2.47	8	2.03	4	-	-	1.73	11	1.21	5
Chlorophthalmus agassizii	-	-	0.58	0.8	0.58	0.8	-	-	-	-	-	-
Sprattus sprattus	0.44	1	-	-	0.58	1	-	-	-	-	-	-
Sardina pilchardus	-	-	-	-	-	-	-	-	1.38	11	0.97	5
Argentina sphyraena	0.89	2	-	-	0.58	1	-	-	1.73	0.47	1.21	3
Myctophidae (unidentified)	0.89	1	0.82	2	0.87	1	-	-	-	-	-	-
Gonostomatiidae	0.44	1	-	-	0.29	0.8	-	-	-	-	-	-
Coelorhynchus coelorhynchus	4.03	6	3.3	8	3.77	7	-	-	-	-	-	-
Hymenocephalus italicus	3.13	7	-	-	2.03	5	-	-	-	-	-	-
Macrouridae (unidentified)	3.58	3	-	-	2.32	2	-	-	0.34	3	24	1
Trisopterus minutus	0.44	1	-	-	0.29	0.8	-	-	-	-	-	-
Gadiculus argenteus	5.82	7	0.82	2	4.06	6	-	-	-	-	-	-
Gadidae (unidentified)	0.89	2	-	-	0.58	1	-	-	0.34	3	24	1
Merluccius merluccius	1.34	3	-	-	0.87	2	-	-	0.69	3	24	1
Lepidotrigla spp.	-	-	-	-	-	-	-	-	0.34	3	24	1
Peristedion cataphractum	0.44	1	-	-	0.29	0.8	-	-	-	-	-	-
Cephola rubescens	-	-	-	-	-	-	-	-	2.43	0.15	1.69	7
Conger conger	-	-	-	-	-	-	-	-	1.04	0.47	0.72	3
Lepidopus caudatus	-	-	-	-	-	-	0.78	3	-	-	24	1
Gobiidae (unidentified)	0.89	1	-	-	0.29	0.8	-	-	-	-	-	-
Trachurus trachurus	-	-	-	-	-	-	-	-	1.38	7	0.97	3
Serranus spp.	-	-	-	-	-	-	1.57	7	2.08	15	1.94	11
Serranidae (unidentified)	-	-	-	-	-	-	-	-	1.38	7	97	3
Spicara spp.	-	-	-	-	-	-	-	-	0.34	3	24	1
Scorpaena spp.	-	-	-	-	-	-	-	-	0.34	3	24	1
Mullus surmuletus	-	-	-	-	-	-	-	-	3.47	23	2.42	11
M. barbatus	-	-	-	-	-	-	-	-	0.34	3	24	1
Boops boops	-	-	-	-	-	-	-	-	0.34	3	24	1
Pagellus acarne	-	-	-	-	-	-	-	-	0.69	7	0.48	3
Teleostei (unidentified)	26.9	51	17.35	52	24.12	51	8.66	22	9.37	46	9.22	33
Total Pisces	52.01	73	31.15	64	43.6	71	11.02	25	29.86	80	24.51	52

Raja clavata (Table I, IV = 8.16%) fed primarily on crustaceans (*f* = 88), with the main prey items being *P. longirostris* (58.4%), *Liocarcinus* spp. (49%), *G. rhomboides* (24.5%), *Xantho* spp. (24.5%) and *Munida* spp. (13.2%) (Table 3). Teleosts and cephalopods were also consumed (*f* = 52 and 20, respectively). Teleosts were comprised of demersal teleosts other than Mullidae and Sparidae (24.5%), Mullidae (11.3%), pelagic teleosts (11.3%), benthopelagic teleosts (9.4%), Sparidae (5.6%) and gadiformes (5.6%) (Table 3). Species of Sepioidea comprised the major part of cephalopods consumed (16.9%, Table 3). Larger specimens (> 50 cm) found to consume more crustaceans and teleosts (*f* = 96 and 80, respectively) than smaller specimens (< 50 cm) which fed predominantly on crustaceans (77%) (Table 1). Larger specimens also consumed more cephalopods (42%, Table 1), predominantly species of Sepioidea (30%, Table 3), than smaller specimens which *Sepia officinalis* was the only cephalopod consumed (3%).

Dietary diversity

The values of *H* for the two elasmobranch species considered in the present study (Table 2) indicate a rather wide variability in their feeding ecologies (*H* = 2.74-4.872).

Table 2. SHANNON-WIENER index (H) of the dietary diversity for two species of elasmobranch

SPECIES	H
Raja clavata (all sizes)	4.872
Raja clavata (> 50 cm)	4.757
Raja clavata (< 50 cm)	3.416
Scyliorhinus canicula (all sizes)	3.094
Scyliorhinus canicula (> 30 cm)	3.02
Scyliorhinus canicula (< 30 cm)	2.74

The thornback ray *R. clavata* was found to have the widest dietary range (*H* = 4.872), taking twentyfour major prey groups (Table 3). Larger specimens (> 50 cm) was also found to have a wide dietary range, taking nineteen major prey groups.

Table 3. Categorized diets of elasmobranchs used in the calculation of dietary diversity and diet overlap. The percent frequency occurrence (PO) of each prey item given in Table 1 have been attributed to 26 distinct prey groups

PREY GROUPS	*S. canicula* (all)	*S. canicula* (> 30 cm)	*S. canicula* (< 30 cm)	*R. clavata* (all)	*R. clavata* (> 50 cm)	*R. clavata* (< 50 cm)
Polychaeta	10.4	17	14	-	-	-
Gastropoda	0.8	2	-	-	-	-
Sepioidea	12	11	10	16.9	30	3
Teuthoidea	8	11	5	3.7	7	-
Bathypolypus sponsalis	-	-	-	1.8	3	-
Copepoda	-	-	-	1.8	-	3
Stomatopoda	-	-	-	3.7	3	3
Euphausiacea	4	5	3	18	-	3
Macrura – Natantia	12	16	9	5.6	03	6
Parapenaeus longirostris	12	23	6	58.4	73	48
Macrura – Reptantia	0.8	-	1	1.8	3	-
Anomura	2.4	2	2	1.8	-	3

Table 3. cont'd

Munida	-	-	-	0.132	0.14	0.11
Liocarcinus	8	8	7	49	76	23
Xantho	-	-	-	24.5	30	18
Goneplax rhomboides	3.2	2	3	24.5	34	14
Brachyura	88	19	08	32	42	25
Mysidacea	64	8	5	75	-	14
Isopoda	64	8	6	37	6	3
Amphipoda	-	-	-	37	-	7
Gadiformes	21.6	10	25	5.6	9	-
Sparidae	-	-	-	5.6	10	-
Mullidae	-	-	-	11.3	23	-
Epibenthic Teleosts	24	-	2	24.5	42	7
Benthopelagic Teleosts	32	2	3	9.4	5.4	3
Pelagic Teleosts	7.2	10	4	11.3	22	-

The second widest niche was possessed by the larger specimens of *R. clavata* (H = 4.757), which exploited nineteen of major prey groups, mostly *Liocarcinus* spp., *P. longirostris*, benthopelagic teleosts, demersal teleosts, brachyuran crabs, *G. rhomboides*, *Xantho* spp. and Sepioidea, respectively (Table 3). The smaller specimens of *R. clavata* (H = 3.416) were also found to feed almost exclusively on decapod crustaceans, primarily *P. longirostris*, brachyuran crabs, primarily *L.* spp., *Xantho* spp. and *G. rhomboides*, and galatheid crabs, *Munida* spp.

The overall *S. canicula* (H = 3.094) was found to feed on eighteen of the major prey groups (Table III), that gadiform fishes, Sepioidea, natantids, *P. longirostris* and polychaetes being the major prey items. The smaller specimens of *S. canicula* (< 30 cm, H = 2.74) which highly fed on gadiform fishes (25%) and polychaetes (14%), were more piscivorous than the larger specimens (> 30 cm, H = 3.02) which

Table 4. SCHOENER's index of diet overlap (Cxy) between two species of elasmobranch. Significant cases of interspesific diet overlap are underlined

SPECIES A	*S. canicula* (all)	*S. canicula* (> 30 cm)	*S. canicula* (< 30 cm)	*R. clavata* (all)	*R. clavata* (> 50 cm)	*R. clavata* (< 50 cm)
S. canicula (all)	-	<u>0.7</u>	<u>0.84</u>	0.01	<u>0.7</u>	0.34
S. canicula (> 30)		-	<u>0.62</u>	0.21	0.38	0.58
S. canicula (< 30)			-	0.07	0.46	0.46
R. calavata (all)				-	0.08	0.48
R. clavata (> 50)					-	0.11
R. clavata (< 50)						-

fed predominantly on *P. longirostris*, brachyuran crabs, polychaetes, natantids and cephalopods.

Dietary overlap

A value of 0.6 or more for the SCHOENERS' Index of dietary overlap is considered significant (PLATELL *et al.*, 1998). Results of the diet overlap between *S. canicula* and *R. clavata* are given in Table 4.

The diet of *S. canicula* (all sizes) was overlapped by large sized (> 50 cm) *R. clavata* (both have a value of 0.7), with two species having cephalopods, natantids, *Parapenaeus longirostris*, brachyuran crabs, demersal and pelagic teleosts as important dietary components.

The diet of large sized *R. clavata* was overlapped by *S. canicula* (all sizes, 0.7), with both species having cephalopods, *Parapenaeus longirostris*, *Goneplax rhomboides*, *Liocarcinus* spp., gadiform fishes, demersal, benthopelagic and pelagic teleosts as important dietary components.

DISCUSSION

Although preliminary, the diets and comparative feeding ecologies of some selachians caught along the Turkish coast of northern Aegean Sea were determined for the first time.

The diet of *S. canicula* has been studied by CAPAPÉ (1974), JARDAS (1972, 1979) and CİHANGİR *et al.* (1997) in the Mediterranean and its tributary seas, and by ELLIS *et al.* (1996) in North-east Atlantic. CAPAPÉ (1974) examined 1769 specimens of *S. canicula* and recorded cephalopods (8 species), teleosts (23 species) and crustaceans (14 species) in the stomachs. JARDAS (1972) examined 151 Adriatic specimens of this species and recorded crustaceans (54.3%), fish (19.2%), cephalopods (18.7%) and polychaetes (7.7%) in the stomachs. JARDAS (1979) recorded, in the order of importance, crustaceans (mainly *Alpheus glaber*, *Squilla desmaresti* and *Upogebia* spp.), fish (mainly *Gadiculus argenteus argenteus*, *Argentina sphyraena* and *Merluccius merluccius*), cephalopods (mainly *Sepiola* spp. and *Todaropsis* spp.) and polychaetes. CİHANGİR *et al.* (1997) examined stomach contents of this species from northern Aegean Sea, and recorded, in the order of importance, teleosts, decapod crustaceans and polychaetes. Results of the presents study indicated that this species mainly feed on teleosts in the area investigated.

The diet of *Raja clavata* has been well studied both in the Atlantic Ocean (HOLDEN and TUCKER, 1974; AJAYI, 1982; MACPHERSON, 1986; ELLIS *et al.*, 1996) and in the Mediterranean Sea (JARDAS, 1972; CAPAPÉ, 1975, cited in CAPAPÉ and QUIGNARD, 1977a). This species has been considered to be a crustacean eater by HOLDEN and TUCKER (1974), AJAYI (1982), MACPHERSON (1986) and ELLIS *et al.* (1996). JARDAS (1972) examined 185 Adriatic specimens of *R. clavata* and recorded, in the order of importance, crustaceans (78%), fish (10.4%), polychaetes (9.4%) and cephalopods (2.2%) as important dietary components, and decapod *Alpheus glaber* (45.1%), the prawns *Pandalina brevirostris* (10.9%), *Solenocera membranacea* (8.7%) and *Munida bamffica* (6.9%) were the most important preys. The present study has confirmed that this species feeds primarily on crustaceans.

Commercially important fish and invertebrates were observed in the stomachs of all species, to various degrees. Among the commercially important species, the shrimp, *Parapenaeus longirostris* was the major prey item, which was consumed by *Raja clavata* (58.4%; in case of large sized *R. clavata* F = 73) and *Scyliorhinus canicula* (12%; in case of large sized *S. canicula* F = 23). The squids, *Todarodes sagittatus* and *Todaropsis eblanae*, were found to prey by *Scyliorhinus canicula*. *Loligo vulgaris* was found in the stomachs of all selachians examined. The cuttle fish, *Sepia officinalis*, was found only in the stomach of *S. canicula*. The occurrence of commercially important teleosts was found to concentrate in the stomach contents of large sized *R. clavata*. Among them, species of Mullidae (*Mullus barbatus* and *M. surmuletus*) were the important preys (23%).

Many elasmobranchs grow to a large size and have the ability to prey on both pelagic and

benthic communities (MACPHERSON, 1986). Differences in the feeding habits will be controlled by factors such as the size, mouth structure and dentition of each species, and their distribution in relation to potential prey items and other predatory species. In the present study, these five selachians, although adapted for a bottom-living existence and feeding primarily on benthic species, can feed on bentho-pelagic and pelagic preys. Ontogenetic shifts in diet are common in elasmobranchs and appear to be adaptations to maximize energy intake, which is generally achieved by large fish switching to larger prey types (MACPHERSON, 1986). In the present study, teleosts were observed in the diets of both *S. canicula* and *R. clavata*. Most of the teleosts consumed by *R. clavata*, were observed in the diet of the large sized (> 50 cm) specimens of this ray. Although, the examined specimens of *S. canicula* mostly comprised of juveniles (mean *TL* 283.15 mm), their diets also contained significant amounts of teleosts.

ACKNOWLEDGMENTS

I wish to thank the crew of the trawling boat ŞEKERBABA 2 for helping me with the field work.

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Accepted: 26 February 2000

Preliminarni podaci o ekologiji hranjenja selahija u sjeverno-istočnom Egejskom moru

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SAŽETAK

Po prvi put su određene i uspoređene ishrana i ekologija hranjenja pojedinih selahija uhvaćehnih u blizini turske obale sjevernog Egejskog mora. *Scyliorhinus canicula* se hrani s koštunjačama, rakovima, glavonošcima i mnogočetinašima, dok se *Raja clavata* hrani pretežito rakovima i to najčešće sa slijedećim vrstama: *Parapenaeus longirostris*, *Liocarcinus* spp., *Goneplax rhomboides*, *Xanto* spp. i *Munida* spp. Koštunjačama i glavonošcima se također hrani i raža kamenica.