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FOOD AND FEEDING HABITS OF THE EGYPTIAN SOLE *SOLEA AEGYPTIACA* (CHABANAUAD, 1972), FROM PORT SAID, MEDITERRANEAN SEA, EGYPT

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ABSTABCT

The food and feeding habits of the Egyptian Sole, *Solea aegyptiaca* (Chabanauad, 1972) were studied in Port Said area, Mediterranean Sea during the period from October 2004 to September 2005. The annual composition of the diet, the intensity of feeding, seasonal variation of diet composition and variation of diet with length, showed a low-intensity of feeding activity of *S. aegyptiaca,* and indicated that they feed on a wide variety of prey types (polychaetes, mollusks, amphipods, sediments and small quantities of crustacean fragments, Ascidia, fish parts, sea grasses, brittlestars, unknown medusae and algae), with a limited variation in diet among seasons. The prey types and size differed from juvenile to adults, juvenile ingested only 5 small prey items; while adult had eaten about 11 of large sized prey items. The diet composition of Egyptian sole is indicative of a generalist feeding strategy.

INTRODUCTION

Flatfishes (Pleuronectiformes) are a successful group of marine temperate shallow water fishes with approximately 520 extant species (Nelson, 1976). They are considered one of the most important predators in benthic communities.

Many studies on the feeding habits of flatfishes that have been conducted all over the world, included these; in the Bering Sea, Gulf of Alaska (Livingston, 1993; 1995), showed that flatfish primarily consume benthic invertebrates, with some larger, wider-gaped species being almost

entirely piscivorous. Other studies from the Mediterranean Sea (De Morais and Bodiou, 1984), New Zealand waters (Livingston, 1987), the Baltic Sea (Aarnio *et al.*, 1996), the Pacific, Kamchatkan Peninsula (Orlov, 1997), the North Sea (Kaiser and Ramsay, 1997) and the Canadian/American Atlantic waters (Methven, 1999) are consistent with this global pattern. Flatfish serve as a major energy pathway for conservation of benthic production into a form suitable for human consumption.

De Groot (1971) found that flatfish tend to be of different feeding groups; fish-feeders, crustacean-feeders, polychaete/mollusks-feeders, thereby minimizing competition for food (Lande 1973; Stickney *et al.*, 1974; Kravitz *et al.*, 1977; Pearcy and Hancock 1978; Steinarsson, 1979).

Soleids (*Solea solea* and *Solea senegalensis*), have been considered apt for commercial aquaculture since the end of the 19th and the beginning of the 20th century (Person-Le-Ruyet, 1986). Although there are still some constraints to full development, it remains a very interesting candidate to diversify the offer of cultured species (Howell, 1997; Flos *et al.*, 1998; Dinis *et al.*, 1999).

Since the position of the Egyptian sole, *Solea aegyptiaca*, in the trophic structure of the eastern Mediterranean Sea, Port Said area, is poorly understood, so, the present work aimed to define the trophic relationships between Egyptian sole with other invertebrates and fishes in this area, as an important step in understanding the dynamics of this regional ecosystem. Beside, results from feeding habits of *S. aegyptiaca* may have direct implications for its local aquaculture.

MATERIALS AND METHODS

The stomach contents of 592 flatfish individuals were examined, on a monthly basis, from October 2004 to September 2005, from the commercial catch (trawl nets) from different fishing sites in Port Said. For each specimen, length to nearest (0.1 cm.) was recorded.

The stomachs were removed and individually stored in 10% NaCl formalin solution. For each fish, the stomach was opened and its contents were removed in 0.9% NaCl. The prey items were separated into the main taxonomic groups, then, a list of general diet composition was made and the numbers of different food items were counted and expressed as a percentage of total.

In the present study, the occurrence method was adopted and the visual estimation for the volume of each food item was made in order to

apply a point method (Hynes, 1950), then, the results were subjected to further statistical analysis according to Godfriaux (1969), in order to give more precise information about food and feeding habits of *S. aegyptiaca*.

Length at the first maturation was calculated to differentiate between juveniles and adults of the target species.

RESULTS

The total length of the examined *S. aegyptiaca* ranged from 9.5 cm. to 31.5 cm with a mean value of 18.9 cm.

1.Annual composition of diet

In *S. aegyptiaca*, the diet composition was represented graphically in Figure (1). Polychaetes made up the major bulk of the diet (41.18 %) by the volume composition of the whole population. The next major food items were supplemented by mollusks which included bivalves and gastropods, (12.65 %), amphipods (11.26 %) and sediments (10.38 %). The minor food items included crustacean fragments (7.95 %), Ascidia (4.59 %), fish parts comprising fish scales, bones, fins rays and spines, (4.77 %), sea grasses (3.88 %), brittlestars (2.88 %), unknown medusae (0.6 %) and algae (0.4 %).

2. Seasonal variation in feeding intensity

The results of feeding intensity are illustrated in Table (1). *S. aegyptiaca* showed a low rate of feeding activity. Fishes whose stomachs were half full, almost full and full of food amounted to 6.7 %, while fishes whose stomachs were empty or have traces of food were represented by 93.3 % of the total specimens.

The feeding intensity revealed seasonal variation, since it was high during autumn (11.4 %), followed by winter (6.7 %) and spring (6.1 %), while the lowest value was recorded during summer (2.7 %).

1. Monthly variation in diet composition

Monthly variation in diet composition of *S. aegyptiaca* is represented in Table (2) and Figure (2). Polychaetes occurred in all months except July, ranging from 87.0 % in October to 18.1 % in January, and dominated the whole items in September (78.7 %), October (87.0 %), November (83.9 %) and December (76.3 % by volume composition).

Mollusks occurred in the period from January to June, ranging from 51.6 % in March to 2.3 % in June, dominating the whole items in February (41.0 %), March (51.6 %) and May (31.4 %). Amphipods and

sediments ranged from 38.1% and 47.6 % respectively in July, to 1.1 % for both items in December by volume composition.

Crustacean fragments occurred in all months except in July and August, ranging from 20.3 % in January to 1.9 % by volume composition in September. Ascidia dominated the whole food items in January (46.1 %), though it occurred from October to February, attaining the lowest value in October (0.6 % by volume composition). Fish parts were the major food items in August (42.0 %), whereas the lowest value was recorded in December and September (1.3 % by volume composition). Sea grasses occurred in all months except in January, March and April, ranging from 14.4 % in June to 1.0 % by volume composition in October. Brittle stars recorded in June 8.4 % and in August 19.6 % by volume composition. Some medusae occurred in May (3.9 %) and in June (3.3 %), while Algae occurred in May, August (2.0 %) and October (0.8 % by volume composition).

1. Food habits in relation to fish size

The variation of food items with length was illustrated in Table (3) and presented graphically in Figs. (3a and b). Within the length group study of the Egyptian Sole population, twenty-five classes ranging from 9.5 to 32.4 cm with 1.0 cm interval were obtained. Prey size differed between juveniles and adults; adults had ingested the large-size prey, whereas the juveniles ingested the small-size prey.

Juveniles of *S. aegyptiaca* (Fig. 3A) were classified into six classes from 9.5 to 15.4 cm, they consumed only 5 types of food items, where polychaetes were the most dominant, constituting 35.0 % by volume composition in all juvenile diet. Polychaetes supplemented by amphipods which constituted 8.3 % by volume composition. They occurred in size range from 13.5 to 15.4 cm long, varying from 59.0 % and 16.2 % respectively in size class 13.5-14.4 to 77.7 % and 23.3 % respectively in size class 14.5-15.4.

Crustacean fragments were the second most important food item representing 23.8 %, followed by sediments (20.8 %) and mollusks (12.1 %) in all juveniles diet that occurred in size range from 10.5 to 14.4 cm. long.

Adults (Fig. 3B) were classified into nineteen classes from 13.5 to 32.4 cm; where polychaetes and amphipods occurred in size range from 14.5 to 24.4 cm. long, varying from 6.1 % in size class 22.5-23.4 to 64.2 % in size class 16.5-17.4, and 4.2 % in size class 16.5-17.4 to 34.3 % in size class 14.5 -15.4 respectively by volume composition.

Crustacean fragments and sediments were ingested by size range from 14.5 to 26.4 cm. long, varying from 1.6 % in size class 15.5-16.4 to 80.0 % in size class 25.5-26.4, and 2.0 % in size class 15.5-16.4 to 31.8 % in size class 22.5 -23.4 respectively by volume composition.

Mollusks were ingested by size range from 14.5 to 22.4 cm long, varying from 9.1 % in size class 14.5-15.4 to 56.6 % in size class 21.5-22.4 by volume composition. Ascidia occurred in size range from 14.5 to 23.4 cm long, varying from 1.3 % in size class 19.5-20.4 to 13.9 % in size class 16.5-17.4 by volume composition.

Fish parts and sea grasses occurred in size range from 14.5 to 25.4 cm. long, varying from 33.3% and 30.0 % respectively in size class 24.5-25.4 to 0.8 % in size class 20.5-21.4 and 1.5 % in size class 18.5-19.4 respectively by volume composition.

Brittle stars, medusae and algae were occasionally taken; brittle stars were ingested by size class 20.5-21.4 cm. and 24.5–25.4 cm. by 4.4 % and 20.0 % respectively. Medusae occurred in size range from 20.5 to 22.4 cm. long, varying from 1.9 % to 6.3 %. Algae occurred in size classes 14.5–15.4 cm, 18.5–19.4 cm. and 25.5–26.4 cm by 1.6 %, 1.3 % and 16.0 % respectively by volume composition.

DISCUSSION

Diets of fishes are related not only to their feeding behavior but also to their digestive morphology and mouth structure (Stickney *et al.*, 1974). Generally flatfishes which are polychaetes–feeders have asymmetrical jaws (Stickney, 1976; De Morais and Bodiou, 1984; Collie, 1987; Rajaguru, 1992; Aarnio *et al.*, 1996; Methven, 1999), and characterized by their small stomach (not highly demarcated), long intestine and lack of gill rakers and pyloric ceaca (Rajaguru, 1992).

In the present work, *Solea aegyptiaca* feeds predominantly on polychaetes (41.18 %) supplemented by mollusks (12.65 %) and amphipods (11.26 % by volume composition), whereas sediments, crustacean fragments, fish parts and Ascidia were minor food items for the target species. This in agreement with *S. solea* (Quiniou, 1978; Ramos 1981; Lagardere, 1987; Molinero *et al.*, 1991; Cabral, 2000), *S. vulgaris* (Ramos, 1981; Lagardère, 1987; Henderson *et al.*, 1992), *S. senegalensis* (Cabral, 2000) and *Buglossidium luteum* (Amara *et al.*, 2004). However, Sá *et al.* (2003) reported that the food items consumed by *S. vulgaris* in the Guadiana estuary (Portugal), consists of a low variety of prey (only polychaetes and Tanaidacea).

In the current work, some individuals were observed with full and gorged stomachs with polychaetes or polychaetes supplemented by amphipods. This might indicate either greater availability or patchy distribution of the major food items. Seshappa and Bhimachar (1955) and Rajaguru (1992) reported the same observation on Malabar sole and the tongue fishes in Indian water.

In the present work, sediments constitute about 10.38 % by volume composition of the main bulk of *S. aegyptiaca*. This abundance was recorded in other flatfishes, such as Malabar sole (Seshappa and Bhimachar, 1955), and tongue fishes (Rajaguru, 1992). Stickney (1976) stated that the high percentage occurrence of sand in the stomachs of black cheek tonguefish *Symphurus plagiusa* might be due to ingestion of a significant quantity of deterial material in its feeding activity. Rajaguru. (1992) recorded that the sediments were probably ingested accidentally with bottom living polychaetes and other fauna.

In the current work, although the primary diets of this demersal flatfish consisted of benthic prey, such as polychaetes, mollusks, it was surprising to find pelagic amphipods; 1.26 % by volume composition and other crustaceans; 7.95 % by volume composition with also relative importance in their diets. especially in juvenile. Egyptian Sole is a demersal flatfish that has never been caught in the pelagic water, either during day or night, and is not known to undergo vertical feeding migration. Pereyra *et al.* (1969) have reported that in eastern North Pacific Ocean, demersal fishes feed on pelagic prey, when such prey approach the bottom along the edge of the continental shelf.

Although there were similarities in food items, the importance of prey species differed from juvenile and adults. In the current work. Juveniles of *S. aegyptiaca* probably owing to their very small mouths, fed predominantly on smaller prey, as crustaceans and young polychaetes, and ingested fewer types (only 5) of food items. Adults of *S. aegyptiaca*, in contrast, had eaten 11 types of relative large-sized prey, primarily large polychaetes, mollusks, crustacean fragments and fish remains; This in agreement with Stickney (1976) who concluded that the mouth size severely limits the size of the ingested prey. Rajaguru (1992) studied the difference in food items chosen between juveniles and adults in other species of flatfishes and recorded that tongue fishes are benthophagus; where the adults feed primarily on polychaetes, while juveniles more often consume smaller prey such as hypriid amphipods and copepods.

The extent of food demands and ability for food acquisition increase with growth and development of fishes (Honda, 1984). Lande (1976) study on the Dab *Limanda limanda*, revealed that larger fish consumed large-sized prey compared with the smaller fish. Pearcy and Hancock (1978) on Dover Sole *Microstomus pacificus;* Rex Sole *Glyptocephalus zachirus;* Slender Sole *Lyopsetta exilis;* and Pacific Sand Dab *Citharichthys sordidu* off Oregon, and Rajaguru (1992) on the tongue fishes, *Cynoglossus arel,* and *C. lida* in Indian water, concluded that the number and the size of prey generally increased with size in these flatfishes, due to the ability of larger fishes to consume a larger range of prey sizes than smaller fishes.

In the present work, the feeding intensity of *S. aegyptiaca* represents a low rate of feeding activity which changes seasonally, to be high during autumn, moderate during winter and spring and low during summer. The variations of diet composition with seasons revealed that in autumn; polychaetes and amphipods were the major items supplemented by crustacean fragments, sea grasses, fish parts, whereas the minor were Ascidia and algae. There was no sign of mollusks, brittlestars and unknown medusae. In winter; polychaetes were the major, followed by Ascidia, mollusks and crustacean fragments, and a small quantities of sediments, amphipods, sea grasses and fish parts. In spring; mollusks and polychaetes were the major items supplemented by amphipods, crustacean fragments, fish parts, sea grasses, unknown medusae and algae. Ascidia and brittlestars were absent. In summer; sediments were the major food item supplemented by amphipods, polychaetes and fish parts, whereas sea grasses. brittlestars, crustacean fragments, algae and mollusks were minor.

In the present work, the low feeding intensity of *S. aegyptiaca* was probably due to a high rate of gastric evacuation. De Groot (1971) reported that *S. vulgaris* due to its characteristics digestive tract and a rapid digestive process, it feeds on small quantities of prey very often. This suggests a high evacuation rate between the stomach and the intestine, and lack of digestion in the stomach (Lagardère, 1987). This high evacuation values has also found for *S. solea* and *S. senegalensis* (Quiniou, 1978; Ramos, 1981; Molinero *et al.*, 1991; Cabral, 2000).

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Table (1): Monthly variation in the intensity of feeding of *Solea aegyptiaca*.

Month	Fish No.	Empty	Poor	1/4 Full	%	1/2 Full	3/4 Full	Full	%
Oct-04	50	48.0	26.0	6.0	80.0	10.0	8.0	2.0	20.0
Nov-04	50	70.0	16.0	4.0	90.0	4.0	4.0	2.0	10.0
Dec-04	48	72.9	14.6	8.3	95.8	2.1	2.1	0.0	4.2
Jan-05	49	63.3	32.7	2.0	98.0	0.0	2.0	0.0	2.0
Feb-05	50	46.0	32.0	8.0	86.0	10.0	2.0	2.0	14.0
Mar-05	50	58.0	24.0	12.0	94.0	4.0	2.0	0.0	6.0
Apr-05	49	51.0	34.7	8.2	93.9	6.1	0.0	0.0	6.1
May-05	50	72.0	16.0	2.0	90.0	0.0	4.0	2.0	6.0
Jun-05	50	62.0	32.0	2.0	96.0	2.0	0.0	2.0	4.0
Jul-05	49	85.7	12.2	2.0	100.0	0.0	0.0	0.0	0.0
Aug-05	49	75.5	18.4	2.0	95.9	4.1	0.0	0.0	4.1
Sep-05	48	79.2	8.3	8.3	95.8	4.2	0.0	0.0	4.2
Total	592	93.3 %				6.7 %			

Table (2): Monthly Variation in Diet Composition of *Solea aegyptiaca*, (Crustacean fr. = Crustacean fragments).

Month	No.	Food items														
		Polychaetes			Mollusks			Amphipods			Sediments			Crustacean fr.		
		Occurrence%	vol. Comp %	Composition%	Occurrence%	vol. Comp %	Composition%	Occurrence%	vol. Comp %	Composition%	Occurrence%	vol. Comp %	Composition%	Occurrence%	vol. Comp %	Composition%
Oct-04	50	57.1	87.0	72.8	-	-	-	14.3	6.7	8.0	-	-	-	20.0	4.0	10.8
Nov.	50	54.2	83.9	79.3	-	-	-	16.7	6.4	3.3	-	-	-	12.5	4.6	2.3
Dec.	48	44.4	76.3	54.2	-	-	-	5.6	1.1	0.4	5.6	1.1	0.8	22.2	10.7	18.5
Jan-05	49	13.6	18.1	15.6	4.5	3.2	5.6	4.5	1.6	2.8	31.8	10.6	24.2	13.6	20.3	16.4
Feb.	50	25.6	37.8	32.2	18.6	41.0	24.4	4.7	2.0	2.6	20.9	7.4	10.6	14.0	6.5	12.4
Mar.	50	10.0	14.4	9.5	33.3	51.6	41.4	16.7	14.9	15.2	23.3	13.0	18.6	10.0	4.4	5.7
Apr.	49	14.3	29.3	16.3	14.3	22.3	16.7	22.9	19.7	20.8	31.4	17.0	26.3	14.3	10.0	15.8
May.	50	15.8	23.1	10.7	21.1	31.4	28.6	10.5	16.1	7.9	10.5	6.7	5.0	21.1	12.9	19.3
Jun.	50	8.7	25.6	10.5	4.3	2.3	5.3	21.7	19.1	24.2	17.4	7.0	11.6	30.4	20.0	33.2
Jul.	49	-	-	-	-	-	-	14.3	38.1	14.3	57.1	47.6	57.1	-	-	-
Aug.	49	20.0	20.0	13.8	-	-	-	-	-	-	20.0	12.2	25.0	-	-	-
Sep. 05	48	53.8	78.7	63.3	-	-	-	7.7	9.7	5.6	7.7	1.9	1.1	7.7	1.9	6.7
Total (Vol. C.)			494.14			151.86			135.16			124.59			95.36	
%			41.18			12.65			11.26			10.38			7.95	

Table (2): *continue* Monthly Variation in Diet Composition of *Solea aegyptiaca.*

Month	No.	Food items																	
		Ascidia			Fish parts			Sea grasses			Brittle star			Medusae			Algae		
		Occurrence%	vol. Comp %	Composition%	Occurrence%	vol. Comp %	Composition%	Occurrence%	vol. Comp %	Composition%	Occurrence%	vol. Comp %	Composition%	Occurrence%	vol. Comp %	Composition%	Occurrence%	vol. Comp %	Composition%
Oct-04	50	2.9	0.6	1.2	-	-	-	2.9	1.0	4.0	-	-	-	-	-	-	2.9	0.8	3.2
Nov.	50	-	-	-	8.3	2.7	13.3	8.3	2.5	1.7	-	-	-	-	-	-	-	-	-
Dec.	48	11.1	6.9	10.8	5.6	1.3	7.7	5.6	2.7	7.7	-	-	-	-	-	-	-	-	-
Jan-05	49	31.8	46.1	35.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Feb.	50	2.3	1.5	1.1	4.7	1.8	7.4	9.3	2.1	9.3	-	-	-	-	-	-	-	-	-
Mar.	50	-	-	-	6.7	1.7	9.5	-	-	-	-	-	-	-	-	-	-	-	-
Apr.	49	-	-	-	2.9	1.7	4.2	-	-	-	-	-	-	-	-	-			
May.	50	-	-	-	-	-	-	10.5	3.9	14.3	-	-	-	5.3	3.9	7.1	5.3	2.0	7.1
Jun.	50	-	-	-	-	-	-	8.7	14.4	6.8	4.3	8.4	4.7	4.3	3.3	3.7			
Jul.	49	-	-	-	14.3	4.8	14.3	14.3	9.5	14.3	-	-	-	-	-	-	-	-	-
Aug.	49	-	-	-	40.0	42.0	37.9	6.7	4.1	8.3	6.7	19.6	6.7				6.7	2.0	8.3
Sep. 05	48	-	-	-	7.7	1.3	1.1	15.4	6.5	22.2	-	-	-	-	-	-	-	-	-
Total (Vol. C.)		55.11			57.29			46.59			27.96			7.18			4.78		
%		4.59			4.77			3.88			2.33			0.60			0.40		

Table(3):Diet Composition of different Size Classes of *Solea aegyptiaca* (Crustacean fr. = Crustacean fragments, B= not found).

			FOOD ITEMS													
			Polychaetes			Mollusks			Amphipods			Sediments			Crustacean fr.		
	Size Range	No.	Occurrence%	vol. Comp %	Composition%	Occurrence%	vol. Comp %	Composition%	Occurrence%	vol. Comp %	Composition%	Occurrence%	vol. Comp %	Composition%	Occurrence%	vol. Comp %	Composition%
Immature	09.5 - 10.4	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	10.5 - 11.4	4	-	-	-	25.0	14.3	33.3	-	-	-	25.0	34.3	20.0	50.0	51.4	46.7
	11.5 - 12.4	12	-	-	-	33.3	72.5	33.3	-	-	-	-	-	-	66.7	27.5	66.7
	12.5 - 13.4	14	-	-	-	20.0	20.0	20.0	-	-	-	20.0	20.0	20.0	60.0	60.0	60.0
	13.5 - 14.4	14	30.0	59.0	47.8	10.0	5.8	11.1	20.0	16.2	13.3	20.0	7.4	22.2	20.0	11.6	5.6
	14.5 - 15.4	6	75.0	77.7	75.0	-	-	-	25.0	22.3	25.0	-	-	-	-	-	-
Mature	13.5 - 14.4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	14.5 - 15.4	38	15.4	30.2	17.0	7.7	9.1	10.0	23.1	34.3	27.5	11.5	7.3	10.8	15.4	6.0	6.7
	15.5 - 16.4	42	45.0	60.4	56.8	25.0	27.2	22.3	15.0	8.8	13.5	10.0	2.0	2.0	5.0	1.6	5.4
	16.5 - 17.4	54	41.0	64.2	41.0	13.6	9.7	17.6	13.6	4.2	7.4	9.1	2.4	11.9	-	-	-
	17.5 - 18.4	70	29.7	51.4	35.5	8.1	10.0	8.8	18.9	17.2	16.5	13.5	4.4	10.0	13.5	7.7	8.5
	18.5 - 19.4	78	26.8	50.1	34.7	7.3	18.1	10.4	9.8	4.9	2.8	24.4	9.9	17.5	12.2	7.2	12.3
	19.5 - 20.4	52	26.2	30.3	24.7	15.8	39.5	16.6	10.5	13.2	10.0	15.8	3.9	8.7	5.3	2.6	6.7
	20.5 - 21.4	62	35.9	61.3	49.4	7.7	12.2	11.7	10.3	6.9	3.7	12.8	2.9	10.0	15.4	7.2	11.3
	21.5 - 22.4	43	9.1	8.8	10.0	27.3	56.6	20.0	-	-	-	27.3	15.0	40.0	27.3	13.3	23.0
	22.5 - 23.4	43	33.2	6.1	36.4	-	-	-	6.7	28.0	6.4	26.7	31.8	22.7	20.0	15.9	16.4
	23.5 - 24.4	28	21.4	54.4	20.0	-	-	-	14.3	9.9	6.4	14.3	15.9	13.6	21.4	10.9	23.6
	24.5 - 25.4	11	-	-	-	-	-	-	-	-	-	57.1	16.7	30.0	-	-	-
	25.5 - 26.4	8	-	-	-	-	-	-	-	-	-	25.0	4.0	2.5	50.0	80.0	57.5
	26.5 - 27.4	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	27.5 - 28.4	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	28.5 - 29.4	0	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
	29.5 - 30.4	0	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
	30.5 - 31.4	0	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
	31.5 - 32.4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table (3): *continue* Diet Composition of different Size Classes of *Solea aegyptiaca,* (B= not found).

			FOOD ITEMS													
			Ascidia			Fish parts			Sea grasses			Brittle star			Medusae		
	Size Range	No.	Occurrence%	vol. Comp %	Composition%	Occurrence%	vol. Comp %	Composition%	Occurrence%	vol. Comp %	Composition%	Occurrence%	vol. Comp %	Composition%	Occurrence%	vol. Comp %	Composition%
Immature	09.5 - 10.4	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	10.5 - 11.4	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	11.5 - 12.4	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	12.5 - 13.4	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	13.5 - 14.4	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	14.5 - 15.4	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mature	13.5 - 14.4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	14.5 - 15.4	38	3.8	3.1	5.0	3.8	1.6	5.0	3.8	3.1	5.0	3.8	1.6	5.0	3.8	3.1	5.0
	15.5 - 16.4	42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	16.5 - 17.4	54	9.1	13.9	7.7	13.6	5.6	14.4	9.1	13.9	7.7	13.6	5.6	14.4	9.1	13.9	7.7
	17.5 - 18.4	70	10.8	6.1	13.1	2.7	1.6	3.8	10.8	6.1	13.1	2.7	1.6	3.8	10.8	6.1	13.1
	18.5 - 19.4	78	4.9	3.7	2.6	7.3	3.3	11.2	4.9	3.7	2.6	7.3	3.3	11.2	4.9	3.7	2.6
	19.5 - 20.4	52	5.3	1.3	6.7	5.3	1.3	6.7	5.3	1.3	6.7	5.3	1.3	6.7	5.3	1.3	6.7
	20.5 - 21.4	62	-	-	-	5.2	0.8	0.7	-	-	-	5.2	0.8	0.7	-	-	-
	21.5 - 22.4	43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	22.5 - 23.4	43	6.7	12.2	9.1	-	-	-	6.7	12.2	9.1	-	-	-	6.7	12.2	9.1
	23.5 - 24.4	28	-	-	-	21.4	5.4	27.3	-	-	-	21.4	5.4	27.3	-	-	-
	24.5 - 25.4	11	-	-	-	14.3	33.3	25.0	-	-	-	14.3	33.3	25.0	-	-	-
	25.5 - 26.4	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	26.5 - 27.4	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	27.5 - 28.4	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	28.5 - 29.4	0	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
	29.5 - 30.4	0	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
	30.5 - 31.4	0	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
	31.5 - 32.4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

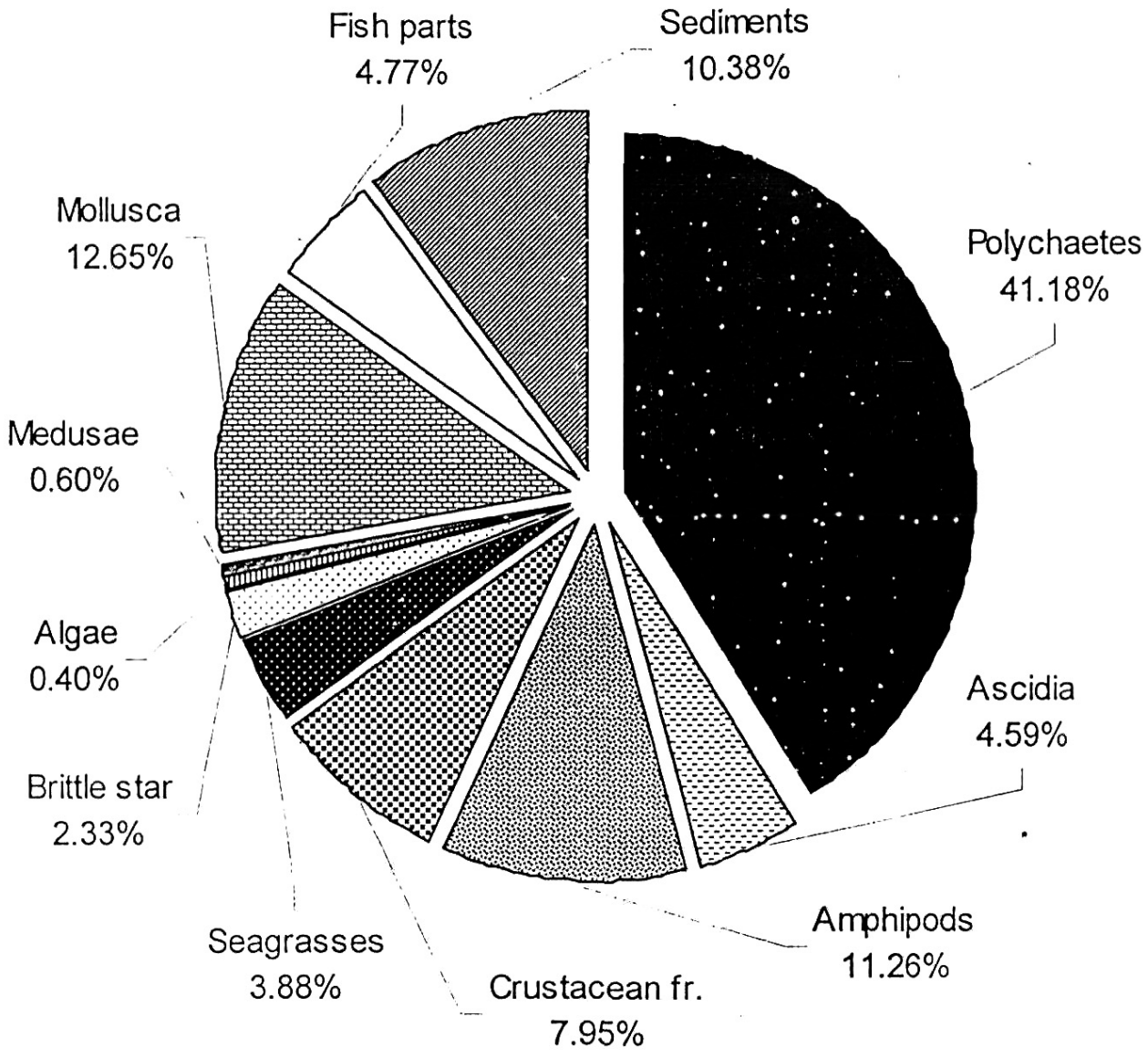


Figure (1): Diet Composition of *Solea aegyptiaca*.

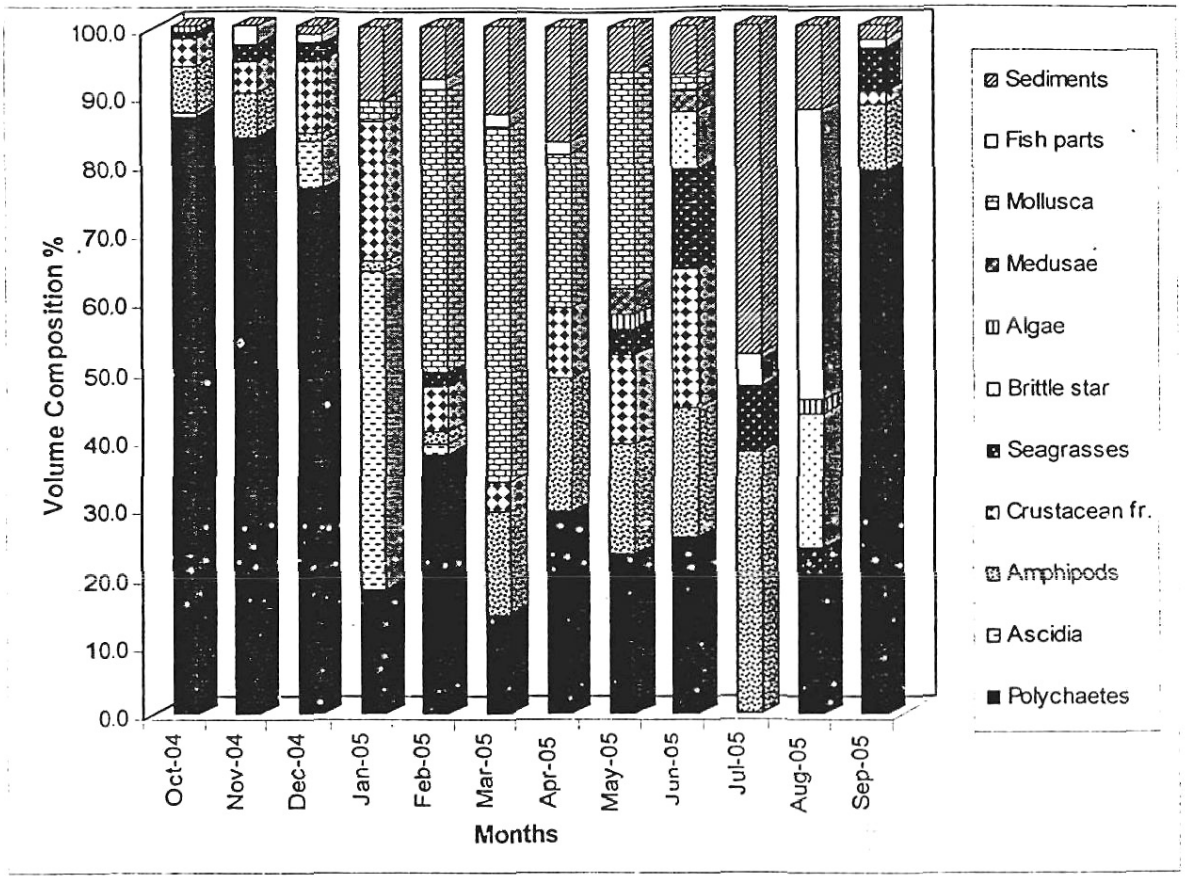
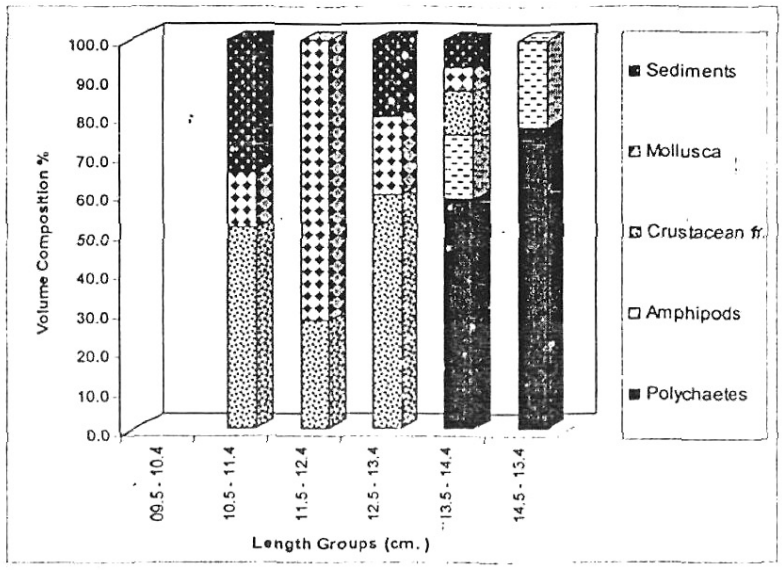
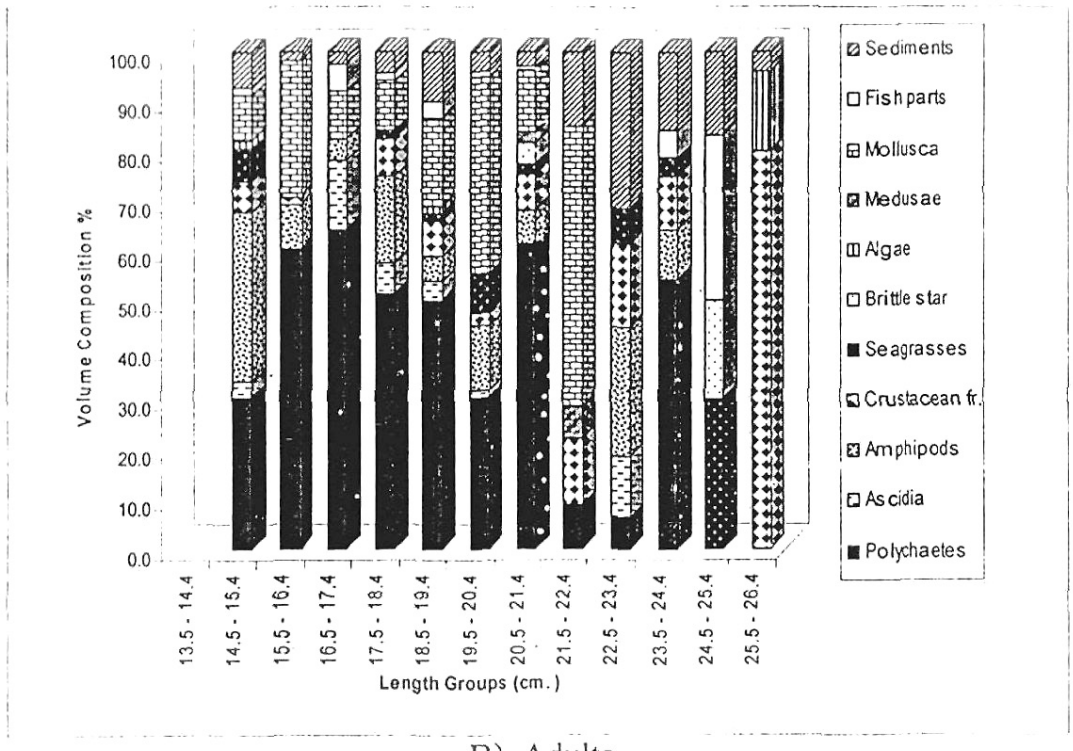


Figure (2): Monthly Variation in food items of *Solea aegyptiaca.*



A) Juvenile



B) Adults

Figure (3): Diet Composition with different Size Classes of *Solea aegyptiaca*.