

## FOOD AND FEEDING HABITS OF DASYATIS PASTINACA

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### ABSTRACT

**Dasyatis pastinaca** is a voracious species which feed all the year round. The stomach contents of 323 fish (169 females & 154 males) have been examined. The major dietary components, based on occurrence and composition methods were Crustacea, fish and polychaetes which were assured by preponderance index. Rate of feeding was higher in autumn than in other seasons. The adults of both sexes eat more teleosts and less crustaceans than the young ones.

### INTRODUCTION

Although several species of elasmobranch fishes are common on the Egyptian Mediterranean waters, the food habits of many species are unknown. **Dasyatis pastinaca** is most common along the Egyptian Mediterranean shores. Information available on the food habits of **Dasyatis pastinaca** come from general observations made in other areas (Bigelow and Schroeder, 1953; Hess, 1961; Zupanovic, 1961; Scott & Tibbo, 1968; Struhsaker, 1969; Wilson & Beckett, 1970; Capape, 1975; and Mc-Eachran, 1982). The purpose of the present paper is to give a comprehensive descriptive account of the food habits of **D. pastinaca**.

### MATERIAL AND METHODS

Fish sampled for the present study were procured from Al-Anfoushy fish market at which fisheries are landed from the coastal Mediterranean waters near Alexandria. Sampling began on June 1983 and ended on May 1984. Sample size of 323 fish of **Dasyatis pastinaca** (169 females and 154 males) ranged between 14.3 cm to 49.5 cm in disc width. Off each fish sex, disc width, gutted weight, the state of stomach (empty or full) as well as the weight of contents were measured.

The fullness coefficient was evaluated as the percentage of completely full guts to the total number of the sample of each season.

The filling index (F.I.) was calculated as the percentage ratio of the weight of stomach contents to the gutted body weight.

The stomach contents of each sample was studied macroscopically and microscopically to identify the food items to the nearest family or generic name.

Qualitative and Quantitative evaluations of different food items were assessed through employing occurrence method (Allen 1935) and point's method (Thompson, 1959). Thenafter, the order of preference was calculated by the preponderance index developed by Natrajan and Jhingran (1961) modified by Hamza (1980).

## OBSERVATION AND RESULTS

### a) Feeding activity :

All fishes showed its highest activity rated during autumn regardless maturation or sex, only females (77.27 %) during spring showed another peak of activity similar to that of males (63.33 %) but higher. The lower rate was recorded during summer and winter for the studied fish (Fig. 1).

It is interesting to note that fishes examined of *Dasyatis pastinaca* during the period of investigation were found to have food in their stomachs. This means that the feeding activity did not stop all year round.

### b) Filling index:

Filling indices have confirmed the previous observation for rate of feeding i.e. higher values of this index was found during autumn and winter for immature fish of both sexes (Fig. 2). Mature fish show their highest values of F.I. in autumn and spring. The filling index for immature fish was slightly higher than that of adults.

### c) Variation of food spectrum :

The food spectrum of *Dasyatis pastinaca* embodies algae, polychaetes, crustacea, molluscs, ascidians and fishes. Crustacea was represented by Isopoda, Amphipoda, Decapoda, shrimps, crabs and Decapoda larvae (Table 1). Mollusca were represented by Bivalvia and Cephalopoda. Fish fry of *Sardinella* spp, *Boops* spp., *Bagrus* spp., *Trachurus* spp. *Merluccius* spp. were the most abundant food items from fish. Digested food as well as eggs of invertebrates constitute a considerable part of the ingested food by this fish.

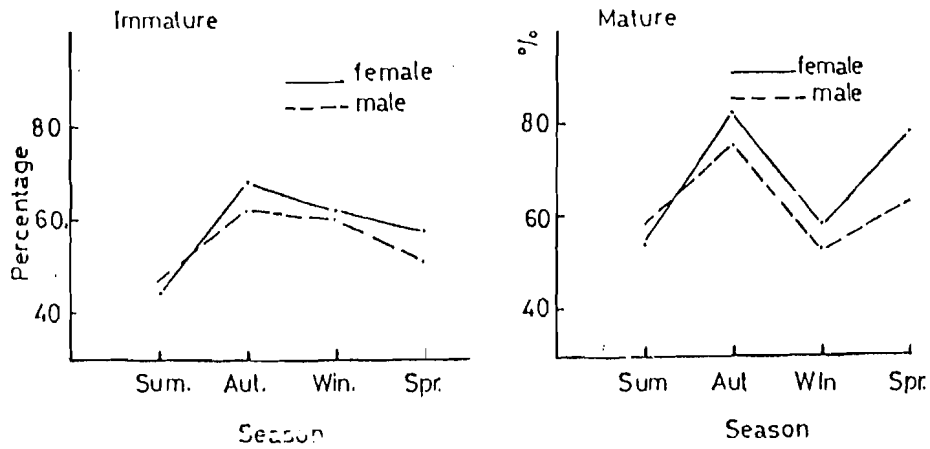


Fig. 1  
Seasonal variation in the fullness coefficient for both immature and mature and inature females and males of *Dasyatis pastinaca*.

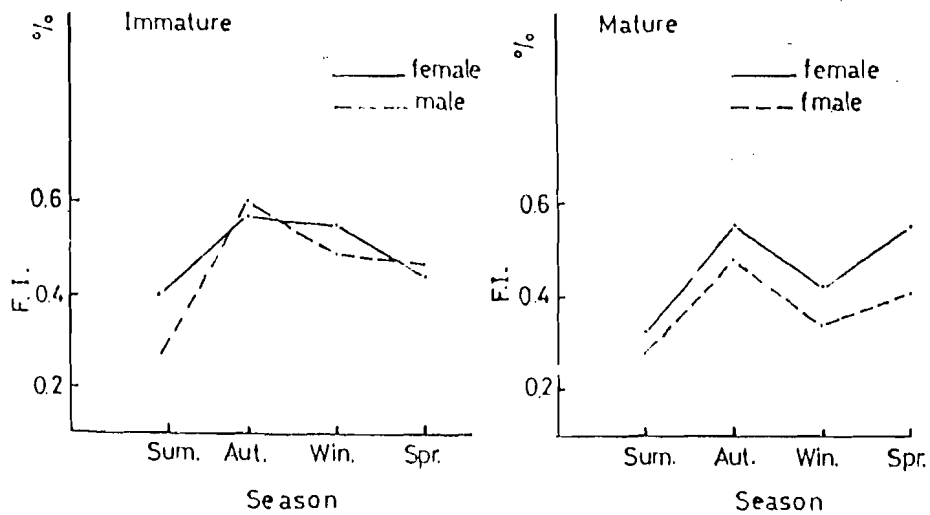


Fig. 2  
Seasonal variation in the filling index for immature and mature and females of *Dayatis pastinaca*

TABLE 1

Percentage composition and percentage occurrence of different food items  
observed in the stomach of *Dasyatis pastinaca*

Food item	Percentage composition	Percentage occurrence
Algae	0.16	2.79
Polychaetes	8.85	33.44
Crustacea:	47.19	71.83
Isopoda	0.20	2.45
Amphipoda	0.26	3.37
Decapoda:	46.73	69.61
Shrimps	14.29	18.65
Crabs	0.57	1.52
Larvae of decapoda	1.82	12.83
Unidentified decapoda	30.05	50.21
Mollusca:	0.24	3.10
Bivalvia	0.05	0.94
Cephalopoda	0.15	1.20
Unidentified mollusca	0.04	1.48
Ascidians	0.12	0.31
Fishes:	22.66	30.65
Fish fries	7.74	10.11
Eggs of <i>Anguilla</i>	0.68	1.17
Sardines	3.18	3.13
Boopd sp.	0.46	0.53
Pagrus sp.	1.38	1.66
Trachurus sp.	0.82	0.83
Merluccius sp.	0.26	0.52
Unidentified fish	8.14	11.14
Digested food	20.10	45.20
Eggs of invertebrates	0.68	15.48

Such food spectrum was subjected to variations attributed to sex, maturity stage and season.

- Variation of Food Spectrum due to Sex :

Crustacea are more ingested in the males (50.94 % composition) than females (43.78 % composition) while fish are more ingested in females (30.23 % composition) than in males (14.35 % composition) (Fig. 3). Ascidians and molluscs are considered less important food item for females almost nil for males.

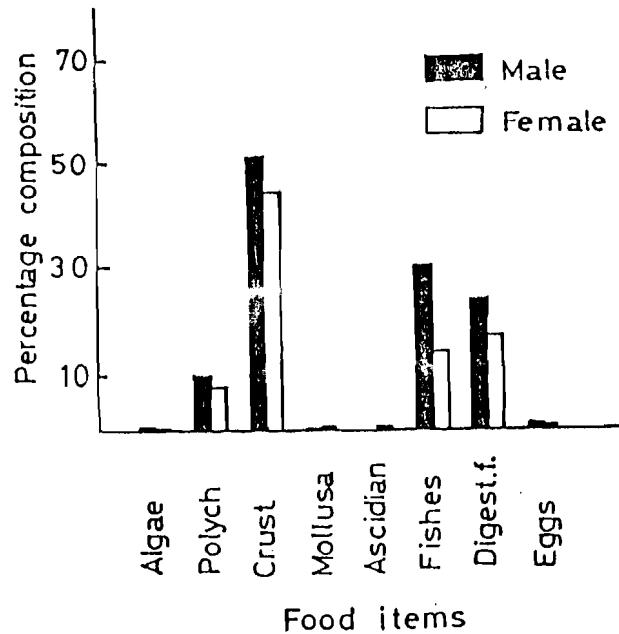


Fig. 3  
Percentage composition of different food items in the stomachs of females and males of *Dasyatis pastinaca*.

- Variation of Food Spectrum According to Sexual Maturity :

Variation of food items according to sex was noticed highly for Crustacea which was present in 81.25 % of the stomachs examined and constituted 59.81 % of the total food items eaten by immature fish (Fig. 4). The second important food item was polychaetes while fish come third in importance.

For adults, fish constitute 36.81 % of the ingested food items. Crustacea came in the second position (Constitute 34.81 %) of the examined food item). Polychaetes ranked third in their importance (7.57%).

Therefore, it can be concluded that *Dasyatis pastinaca* to be considered as selective to crustacea, fish and polychaetes throughout its life being the most prominent food item in the spectrum. As the fish gets to maturation it ingests more fish and less crustacea. On the other hand, algae molluscs, ascidians and invertebrate eggs can be considered as accidental for both immature and mature fish.

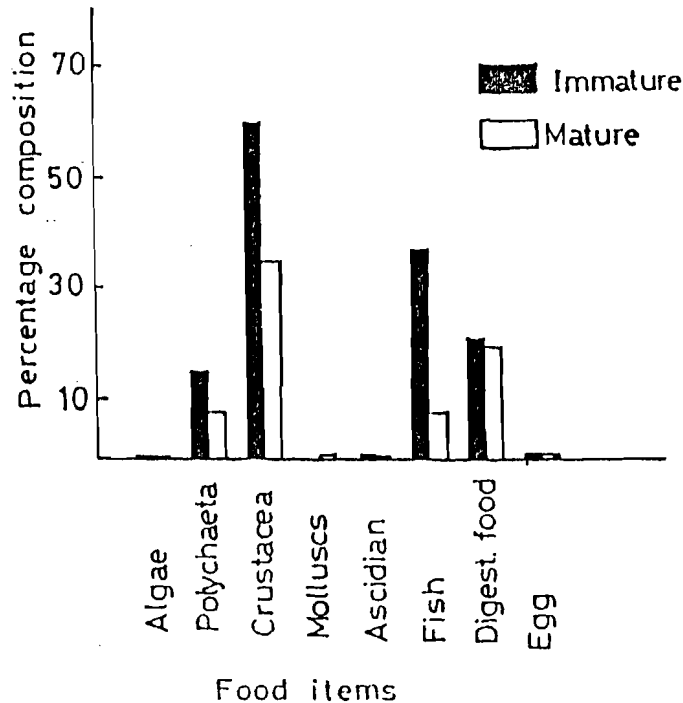


Fig. 4  
Percentage composition of different food items in the stomach of *Dasyatis pastinaca*

- Variation of Food Spectrum with Season

Here, Crustacea is also the most frequently found food item among others in all the stomachs examined while fish come next. This was true for all seasons (Table 2). Comparatively during winter the percentage composition of Crustacea was highest (92.59 % occ. and 51.11 % comp.) than other seasons. For fishes, the percentage composition was higher during summer (26.89 %) and spring (26.47 %) while polychaetes showed lower percent of abundance during the same seasons. Algae, molluscs and ascidians were of less importance.

d. Preponderance index:

Crustacea (63.95 %) represented the first selected food item eaten by *Dasyatis pastinaca* (Table 3). Fish (13.1 %) was second rank in importance while polychaetes (5.59 %) came third. Algae, molluscs, ascidians and eggs are to be accidental food items.

TABLE 2  
Percentage occurrence and percentage composition of differ items in the stomach content of *Dasyatis pastinaca* in various

Season	Summer		Autumn		Winter		Spring	
Sample size	77	77	80	80	81	81	85	85
Food items	% occ	% Comp	% Occ	% Comp	% Occ	% comp	% Occ	% Comp
Algae	15.79	0.39	3.57	0.11	8.00	0.16	5.00	0.09
Polychaetes	52.62	4.19	32.14	11.10	55.56	13.55	45.00	5.90
Crustacea	68.42	36.81	77.27	48.59	92.59	51.11	77.78	50.18
Molusca	52.63	0.15	3.33	0.05	12.00	0.75	3.45	0.07
Ascidian	---	---	---	---	---	---	3.45	0.45
Fishes	52.63	26.89	33.33	18.51	29.63	19.63	65.52	26.47
Diges. food	63.16	30.95	66.67	20.80	51.72	14.06	55.00	16.18
Eggs	24.24	0.62	27.27	0.84	17.24	0.76	22.22	0.39

TABLE 3

Preponderance index for different food items in 233 stomachs of  
*Dasyatis pastinaca*

Food item	Preponderance index
Algae	0.01
Polychaetes	5.59
Crustacea	63.95
Mollusca	0.01
Ascidians	0.00
Fishes	13.10
Digested food	17.14
Invertebrate eggs	0.20

#### DISCUSSION AND CONCLUSION

Food and feeding habits of *Dasyatis pastinaca* proved that Crustacea is the main food item preferred by *Dasyatis pastinaca*. Fishes come next while polychaetes rank third. Algae, ascidians and molluscs seem to be accidental. Such result is in full accordance with the previous results made by Hess (1961) and Struhsaker (1969) on *Dasyatis centroura* from Delwar Bay and off the southeastern United States. The order of abundance of the food items in the stomachs of *Dasyatis pastinaca* from Tunisia examined by Capape (1975) consisted of the same items with minor change in order of preference. Same observation was made by Bigelow and Schroeder (1953) for *Dasyatis americana* from Florida while the stomach contents of *D. centroura* taken near Woods Hole contained nearly the same food items. Similarly, Scott and Tibbo (1968), Wilson and Beckett (1970) followed by McEachran (1982) showed that *D. violacea* feeds mainly on teleosts and crustaceans. Variations existing in the details of food spectrum studied by different author can be attributed to regional variations in the abundant food. Nikolsky (1963) has reached to the same conclusion, i.e. selectivity to any food item has a relation with its abundance in the surrounding environment.

The degree of stomach fullness in *Dasyatis pastinaca* as well as filling Index showed that neither males nor females have nearly empty stomachs i.e. fish feed throughout the whole year regardless size, age, season or sex.



It has been found that immature fish of this species under study feed mainly on Crustacea and Polychaeta while adult fish acts as a predator on fishes. Such observation was also given by Zupanovic (1961) and Struhsaker (1969) for *Dasyatis centroura* in the Adriatic Sea and southeastern United States.

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