Indian J. Fish., **54**(2) : 235-238, Apr.-Jun., 2007

Note

Some aspects on the biology of *Himantura bleekeri* (Blyth) and *Amphotistius imbricatus* (Schneider) from Mumbai

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ABSTRACT

Himantura bleekeri and *Amphotistius imbricatus* are bottom carnivores, with crustaceans ranking first in the food items followed by teleosts, molluscs and polychaetes. Number of poorly fed individuals was high in both the species. These species breed throughout the year. The male : female ratio of *H. bleekeri* for 1989-'05 and of *A. imbricatus* for 1997-'05 were 1:0.98 and 1:1.36 respectively. The length-weight relationship was: Log W= -8.7298 +2.7297 Log L for *H. bleekeri* and Log W = - 6.4691 +2.3119 Log L for *A. imbricatus*.

Information on the biology of Himantura bleekeri from Indian seas are limited except for the brief account given by Setna and Sarangdhar (1949) from Bombay and Devadoss (1978a), from Cuddalore. Some aspects of the biology of A. imbricatus have been reported by Devadoss (1978b, 1984) from Porto Novo, Tamil Nadu. Since no biological information on these species is available off Mumbai, an attempt was made to fill the gap to certain extend and results obtained are presented. Biological data on *H. bleekeri* collected during 1989-2005 and on *A. imbricatus* during 1997-2005 from New Ferry Wharf were analysed for this study. The details on the length (across the disc) in cm, weight in kg, sex, maturity of females and food habit of both species were collected. Rays with stomach in gorged, full and ¾ full condition were considered as active feeders. The food composition was identified up to genus level and, when possible, up to species level. The dietary importance of each food item was determined using the index of preponderance (IP). Reproductive stages of females were assessed as: immature (ovary only as loose cells and oviduct thin and slender), mature (ripe ovarian eggs or large yolked eggs, distended uterus), pregnant (embryo in the uteri) and post natal (uteri baggy with pit inside and trophonemata worn out).

A total of 496 specimens of *H. bleekeri* were examined for stomach content, of which 429 (86.5%) were nearly empty (Table 1) and found predominantly in all the months. Out of the 742 stomachs of *A. imbricatus*, 598 (80.6%) were empty. The maximum number of such stomachs (94.0%) were recorded in August and the minimum in May

TABLE 1: *Feeding intensity and average volume of stomach content in* H.bleekeri *(Pooled 1989 - 2005) and* A.imbricatus *(Pooled 1997 - 2005)*

Months	*H.bleekeri*					*A.imbricatus*				
	No. of specimens	Condition of stomachs (%)			Average vol. of food (ml)	No. of specimens	Condition of stomachs (%)			Average vol. of food (ml)
		Active	Normal	Poor			Active	Normal	Poor	
January	28	7.1	14.3	78.6	1.7	75	—	14.7	85.3	0.43
February	84	2.4	8.3	89.3	1.65	67	1.5	14.9	83.6	0.54
March	30	—	6.7	93.3	5.7	70		8.6	91.4	0.25
April	122	6.6	9.8	83.6	4.86	85	1.2	21.2	77.6	0.57
May	84	5.9	11.9	82.2	5.42	66	3.0	25.8	71.2	0.45
June	11	—	9.1	90.9	5.63	18	—	27.8	72.2	1.23
July	—	—	—	—	—	16	—	12.5	87.5	0.32
August	—	—	—	—	—	50	—	6.0	94.0	0.16
September	—	—	—	—	—	76	—	17.1	82.9	0.40
October	32	3.1	—	96.9	1.51	66	—	33.3	66.7	0.51
November	53	—	3.8	96.2	1.19	76	—	22.4	77.6	0.61
December	52	1.9	19.2	78.9	1.7	77	—	20.8	79.2	0.60
Pooled	496	3.8	9.7	86.5	3.36	742	0.5	18.9	80.6	0.48

(71.2%). In *H. bleekeri*, the mean volume of food per fish was 3.36 ml and in *A. imbricatus* 0.48 ml. *H. bleekeri* fed primarily on crustaceans (61.8%) followed by teleost (17.0), molluscs (12.7%) and polychaetes (0.6%).

Among crustaceans, three most frequently preferred food items were *Squilla* spp. (26.7%), *Nematopalaemon tenuipes* (18.4%) and *Solenocera* spp. (12.9%). Other food items found were *Parapenaeopsis stylifera* (2.3%), *Exhippolysmata ensirostris* (0.7%), prawn remains (0.6%) and crabs (0.6%). Crustaceans formed the dominant food items during January, March-June and October-November. The teleost food items in the order of abundance were: *Coilia dussumieri* (11.1%), sciaenids, *Polynemus heptaductylus*, catfishes, *Bregmaceros macclellandi*, *Trypauchen vagina*, *Harpodon nehereus*, *Apogon* spp., *Cynoglossus* spp., *Myctophum* spp. and egg mass, their availability being highest in February and lowest in January. Molluscan food comprised mainly of bivalves and rarely by *Loligo* spp. Molluscs were consumed maximum in May and minimum in December. Polychaetes were noticed in March only.

In *A. imbricatus* also crustaceans (75.8%) formed the most dominant food followed by teleosts (2.8%), molluscs (0.03%) and polychaetes (0.01%).

Acetes spp. (20.7%) was the most common prey among the crustaceans. The other crustaceans found in the stomach in the order of abundance (%) were *N. tenuipes* (6.6), *Solenocera* spp. (3.8), *Squilla* spp. (1.4), *P. stylifera* (0.1), *Parapenaeopsis* spp. (0.03), *E. ensirostris* (0.02), and crab (0.02).

Crustaceans constituted more than 62.0% of the food in January, April-May and September-November. Among the teleost diet %, *Coilia dussumieri* (0.4%), *Apogon* spp. (0.01%), *Cynoglossus* (0.01%) and *Myctophum* spp. (0.01%) were represented. The highest IP for teleosts was noticed in August and lowest in September. Molluscan diet was represented by *Octopus* spp. (0.02%) and *Sepia* spp. (0.01%) in January and April. Polychaetes were represented only by *Neries* spp. Digested matter composed of fish scales, bones, mucus and mud.

It is evident that these rays forage on the bottom living organisms like crustaceans, molluscs and polychaetes. Similar observations were made by Devadoss (1978 and 1984) on rays from Porto Novo and Cuddalore region and by Raje (2003) from Mumbai waters.

A total of 267 specimens of *H. bleekeri* and 428 specimens of *A. imbricatus* were examined for breeding behaviour. Mature females of *H. bleekeri* were recorded during January-June and October-December, pregnant ones during February- June and post natal in April-May. Availability of mature females of *A. imbricatus* in almost all the months and post natal in January-February, April-May, September and November indicated prolonged breeding activities. This assumption is supported by the occurrence of free swimming young ones of *H. bleekeri* (16-30 cm) and *A. imbricatus* (10-15 cm) all round the year.

The ovary with large mature ova and full term embryos were also noticed in uterus of both the species. It indicated that copulation, ovulation and fertilization take place almost immediately after the termination of the current pregnancy as indicated by Ford (1921) and Devadoss (1978 c, 1998) in batoid fishes. Prolonged breeding activity of *D. imbricatus* has been observed by Devadoss (1978 b) off Porto Novo coast and Jones and Sujansingani (1954) in Chilka Lake.

The overall sex ratio of *H. bleekeri* was 1 male to 0.98 females. The distribution of sex ratio was significant in February and June due to dominance of females and in March and October due to predominance of males. The pooled ratio of males to females in *A. imbricatus* (1:1.4) was significantly different at 1% level. Monthwise sex ratio showed significant difference in February, April and November with preponderance of females. Devadoss (1978 b) noted sex ratio as 1 female : 1.05 male in *D. imbricatus* off Porto Novo.

The log value of length across disc in cm and weight in kg were regressed as per least square method.

The regression equation for 355 males (24-82cm) and 383 females (27-101 cm) of *H. bleekeri* and 652 males (14-34cm) and 970 females (13-36cm) of *A. imbricatus* were determined. Analysis of covariance revealed no significant difference between the sexes of both the species, and therefore a common equation for each species was derived as:

H. bleekeri :

Log W = - 8.72967 + 2.72967 Log L (r = 0.86)

A. imbricatus:

Log W = - 6.46910 + 2.3119 Log L (r = 0.83)

Acknowledgements

The author is grateful to Prof. (Dr.) Mohan Joseph Modayil, Director; Dr. E. Vivekanandan, Head of D. F. Division C. M. F. R. Institute, Cochin and Dr. V. D. Deshmukh, for their encouragement. Help rendered by technical staff,

Mr. Thakurdas, B. B. Chawan, J. D. Sarang, J. R. Dias, and S. K. Sujit, in the field and Veena. S, for typing the MS is acknowledged.

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Date of Receipt : 19-08-06
Date of Acceptance : 23-03-07