Marsh Bulletin *2(2006) 154-159*

MARSH BULLETIN

Amaricf_Basra office@yahoo.com
abdulalwan@yahoo.com
.marshbulletin@yahoo.com

Diet Composition of Three Catfishes from Al-Hammar Marsh, Al-Fuhoud, Iraq

A. A. Al-Shamma'a

Animal Nutrition Dept. Directory of Agricultural Researches and Food Technology Ministry of Science and Technology.
P. O. Box. 765, Baghdad, Iraq.

Abstract

The stomach contents of three catfish species were studied. These were *Silunis triostegus* Heckel, 1843, *Heteropneustes fossilis* (Bloch, 1794), and *Mystus pelusius* (Solander in Russell. 1794). Fishes were collected from Al-Hammar Marsh near Al-Fuhoud during the period from March 1989 to Febaiary 1990. Small fish fonned 70.7% of the volume of food consumed by *S. triostegus* and 83.2% according to ranking index. While shrimp and insects larvae were rankfed first and fonned 47.7% and 59.4% of the food components *M. petusis* according to volumetric method and ranking index, respectively. Detritus and non-nutritional materials comprised 51.7% and 67.9% of stomach contents *H. fossilis* according to the two methods mentioned above respectively M *plusius* was the most active feeding fish .

1. Introduction

Four genera of catfish are available in Iraqi waters (Al-Daham 1977). However only three of them were found in Al-Hammar Marsh. These were *Silunis triostegus* Heckel. 1843; *Mystus pelusius* (Solander in Russell ,1794) and *Heteropneustes fossilis* (Bloch. 1794). Although *S. triostegus* is an important food fish in mid and north of Iraq, most people who live near the marshes does not utilize it. The other two species are never used as food in Iraq. The food habit *ofS. triostegus, S. glanis* and *H. fossil is* were studied in some of Iraqi waters (Al-Seyab, 1988 ; Hammady, 1995 ; Khalaf, *et. al.* 1987 ; Daoud, *et al*, 1999). Since the ecological conditions are different from place to other influencing directly the abundance of planktons and benthos population that fishes feed upon. Moreover, no many published data on the food of *M. pelusius* are available in Iraq as well as, few were

2. Materials and Methods

Fish were collected from the west north of Al-Hammar Marsh, near Al-Fuhoud using cast net and seine net as in Al-Shamrha'iv and Jasim (1993), from March 1989 to February 1990. The alimentary canals of these catfishes have a prominent stomach indicating their respective feeding habits. In the present investigation only the stomach contents have been studied. Less advanced digestion making the identification of food items easier. A total of 304 stomach 100 for *S.triostegus*, 105 for *M pelusius* and 99 for *H. fossilis* were examined. Fishes were immediately killed by a blow to the head, and brought to the -laboratory by ice-box and then kept in deep freeze. After thawing, the total length and total weight of fish were recorded to the nearest millimeters and grams, then fish were dissected. Stomach contents were examined under different magnifications ranged between (40x and 450x) using a dissecting and compound microscopes. Percentage composition of each food item in all examined fish were calculated by occurrence (O%), volumetric method (V%) (Hyslop, 1980; and Al-Shammma'a, 1986) and ranking index (R%= 0% x V%) Hobson, 1974). devoted to the other two species. The present work aims to provide information on the food habit of different catfishes in Al-Hammar Marsh.

The degree of stomach fullness was also taken into consideration. It is very difficult to identify the aigae, crustaceans and insect larvae even up to genera because they were always semi-digested. Almost all sampled fish of each species belong to the same size group. Diet overlap of the three fish species were determined by calculating values in food utilization using Horn (1966) equation :

$$C_H = \frac{2\Sigma P_{ij} P_{ik}}{\Sigma P^2_{ij} \quad \Sigma P^2_{ik}}$$

Where Pij, Pik=proportipn of total diet offish species j or k contributed by prey taxon i. Values ofCnO.6 or greater are accepted as showing significant overlap (Zaret & Rand., 1971). Feeding activity (Gordon, 1977) and feeding intensity offish (Dipper *et al*, 1977) were also considered. Dietary items were grouped into insects; zooplanktons (cladocera, rotifera & copepoda); other crustacean (shrimps); phytoplankton (diatoms and other algae); oligochaetes; fishes; higher plants; detritus; debris; unidentified digested food and other (non nutritional materials, metals and blastics).

3. Results and Discussion

The diets of *S. triostegus*, *M. pelusius* and *H. fossilis* by volume, occurrence, and ranking index methods are listed in Tables (1-3). Fish and fish parts were found to be the most important food taken by *S. triostegus* forming 70.7%, 24.5% and 83.2% of diet components according to the volume, occurrence and ranking index methods, respectively. Whereas, detritus and plant materials may be taken by fish accidentally or with small fishes inside their guts. Such notes were also reported by (Al-Seyab (1988) and Hammady(1995).

Table (1): Food items (%) of *Silurus triostegus* by volumetric (V) and occurrence (O) methods as well as ranking index (R).

	Spring			Summer			Autumn			Winter			All		
	V	O	R	V	O	R	V	O	R	V	O	R	V	O	R
Insects	1.1	5.9	0.3	0.9	4.0	0.2	0.6	3.9	0.1	2.1	11.1	1.3	1.2	6.2	0.4
Zooplankton	-	-	-	2.1	9.5	0.9	1.3	15.7	0.8	3.3	11.8	1.0	1.7	10.0	0.8
Crustacea	2.1	1.8	0.2							1.8	11.1	1.1	0.9	3.2	0.1
Phytoplankton	1.6	14.3	0.8	1.8	13.5	1.1				0.9	7.1	0.4	1.1	8.8	0.5
Oligochaeta	0.5	0.6	–	-	-	-	-	-	-	-	-	-	0.1	0.1	+
Fish	72.4	20.8	77.4	70.3	25.7	83.1	75.0	29.4	88.9	65.1	22.2	80	70.7	24.5	83.2
Plant tissues	-	-	-	2.7	5.4	0.3	1.3	5.9	0.3	2.9	3.7	0.6	1.7	3.8	0.3
Detritus	11.1	20.2	11.5	10.1	20.3	9.4	9.6	11.8	4.6	8.7	11.1	5.4	9.9	15.9	7.6
UDI*	7.2	17.9	6.6	5.6	10.8	2.8	3.8	17.6	2.7	11.6	14.8	9.5	7.1	15.3	5.2
Debris	3.5	16.7	3	4.4	6.8	1.4	4.5	7.8	1.4	3.6	3.7	0.7	4	8.8	1.7
Others	0.5	1.8		2.1	4	0.4	3.8	7.8	1.2	-	-	-	1.6	3.4	0.2
No. offish examined		35			30			17			18			100	
Feeding intensity		2.1			22.3			23.5			21.4			23.8	
Feeding activity (%)		82.9			75.6			76.5			66.7			75.4	

*UDF: unidentified digested food, +<0.1%

Table (2): Food items (%) of *Mystus pelusius* by volumetric (V) and occurrence (O) methods as well as ranking index (R).

	Spring			Summer			Autumn			Winter			All		
	V	O	R	V	O	R	V	O	R	V	O	R	V	O	R
Insects	26.2	15.7	37.7	29.4	23	12.2	19.8	16	29.3	20.7	15.7	22.6	24	17.6	33.5
Zooplankton	9	7.8	6.4	8.7	11.5	3.9	8.4	7.9	6.1	17.3	17.6	15.1	9.3	11.7	8.4
Crustacea	26.9	9.7	23.9	25.7	20.7	33.2	32.4	11.1	33.2	10	13.7	9.5	23.7	13.8	25.9
Phytoplankton	5.1	17.1	8.5	4.5	8	2.2	5.6	17.5	9.1	6.1	7.8	3.3	5.1	12.6	5.1
Oligochaeta	1.2	6.9	0.8	1	2.3	0.1	1.3	6.4	0.7	1.2	2	0.2	1.2	4.4	0.4
Fish	10.1	7.4	6.8	12.7	13.8	10.9	14.4	6.5	8.6	26.8	19.6	36.6	16	11.8	15
Plant tissues	8.2	5.9	4.1	9.1	4.6	2.7	2.7	4.8	1.2	2.5	2	0.3	5.7	4.3	1.9
Detritus	3.1	6.9	2	2	3.4	0.4	1.8	6.4	1.1	7.3	5.9	3	3.6	5.7	1.6
UDI*	3.7	7.8	1.1	1.5	8	0.7	10.5	7.8	7.6	10.6	11.8	8.7	6.6	8.9	4.7
Debris	6.2	11.8	8.1	5.7	4.6	1.6	2.2	15	3.1	2.5	3.9	0.7	4.2	9.6	3.1
Others	-	-	-	-	-	-	1	0.5	1	-	-	-	1	1	1
No. offish examined		38			20			35			12			105	
Feeding intensity		44			38			35			35			38.8	
Feeding activity (%)		89.5			85			88.6			83.3			86.6	

*UDF: unidentified digested food

Table (3): Food items (%) of *Hetropneustes fossilis* by volumetric (V) and occurrence (O) methods as well as ranking index (R).

	Spring			Summer			Autumn			Winter			All		
	V	O	R	V	O	R	V	O	R	V	O	R	V	O	R
Insects	6	11.2	4.5	8.2	8.8	5.3	8.4	6.2	1.6	5.4	8.3	3.8	7	8.6	4.4
Zooplankton	1	2.2	0.1	1.1	3.3	0.3	1.4	2.5	0.2	4	6.5	2.1	1.9	3.6	0.5
Crustacea	-	-	-	3.3	3.3	0.8	-	-	-	2.7	2.1	0.5	1.5	1.3	0.1
Phytoplankton	1.9	14.9	1.9	1.2	13.2	1.2	4.9	8.6	2.9	3.4	12.5	3.6	2.9	12.5	2.6
Oligochaeta	1.3	2.2	0.2	-	-	-	1.4	4.9	0.5	1.3	4.1	0.4	1	2.8	0.2
Fish	13.3	7.5	6.6	15	6.6	7.2	10.5	12.3	8.9	8.7	6.3	4.6	11.9	8.2	7.1
Plant tissues	7	11.2	5.2	9.5	5.5	3.8	9.1	8.6	5.4	8.7	12.5	9.1	8.6	9.5	5.9
Detritus	40	20.2	53.9	33.6	20.9	51.1	35	23.4	56.6	23.5	18.7	36.9	33	20.8	49.9
UDF*	1.3	2.2	0.2	2.7	7.7	1.5	5.6	6.2	2.4	10.1	8.5	7	4.9	6.1	2.2
Debris	8	11.4	7.2	9.3	14.3	9.7	6.2	17.1	7.4	10.7	6.3	5.7	8.6	12.8	8
Others	20.2	14.9	20.1	16	16.4	19.1	17.5	9.9	12	21.4	14.6	26.3	18.7	14	19
No. of fish examined		30			20			29			20			99	
Feeding intensity		41			50			34			38			36.1	
Feeding activity (%)		76.7			75			78.9			80			77.7	

*UDF: unidentified digested food

However, fish parts contribution were (11.9%, 8.2% and 7.19) for *H. fossilis* and (16%, 11.8% and 15.0%). For M *pehisius* . Daoud, *et al.* (1999)., found that *S. glanis* L. from Al-Garraf canal preyed mainly on vertebrate animals other than fish beside the small fishes. The three studied species fed on leek insects and insect's larvae. These were represented mostly by *Chironomid* larvae, other dipterans larvae immature stages of aquatic beetles and insects adults. These food items constituted (26.2% , 29.4% , 37.7% and 42%) during spring and summer, in the diet of M *pelusius.* followed by shrimp (Table 2). Animal components, including fish, formed 79.8 % and 87.5 % of the diet by the volumetric method and ranking index, respectively. Insects and crustaceans were also occurred in the diets of the other two catfishes but with negligible percent.

However, no many available information on the diet of M *Pelusius* in Iraq to be compared. This species' fed mainly on insects and it's larvae (R=87.9%, V%=77.3%) in Tigris River (Al-Shamma'a *el al.*, 2000). Unpublished data by the author from Almassab Ala'am river, showed that M *pelusius* also depending on insect larvae, shrimp and zooplankton. Pandian, (1966) found that M *gidio* preyed mainly on Cyclops during rainy season (August-November) and chironomus during December to March. Whereas, Khalaf *et.al*, (1987) found that *H. fossilis* from Diyala river were mainly fed on insect's larvae during spring and on insects and fish during autumn. Organic detritus were also found in the stomach of the three species. It formed 33% of the diet of *H. fossilis* by volume (R~ 49.9) (Table 3), followed by the category other (18.7%) in which small pieces of plastic, clothes, papers and glasses were included. It consumed large

amount of non nutritional materials (R=27%). Detritus and non-organic materials were also reported by Al-Daham *et.al.* (1977) and Johal (1981) to be included in *H. fossilis* diet.

Feeding activity (%) showed that fishes were more active during spring than other seasons. It is also showed that M *pehisius* was the most active feeder (86.6%). Feeding intensity also proved „ more points where awarded to fish during spring. However. *S. triostews* were found with lowest full stomachs (23.8%). Similarity index (C_H) showed no significant overlap among the diets of the three species, due to apparent different in their food habits.

4. References

Al-Daham, N.K.(1977). Fish of Iraq and the Arab Gulf. Vol.1. Al-lrshad Press, 546 pp. (In Arabic).

Al-Dahara, N.K. ; Sarker,A.L. and Bhatti, M.N.(1977). Diet patterns of feeding in *Heteropneustes fossilis* southern of Iraq. Trans. Amer. Fish. Soci. 106 (6): 614-616.

Al-Shamma'a,A.A(1986). The Feeding Ecology of Fish in Llyn Forngoch. Ph.D. thesis, University College of Wales. Abrystwyth. U.K . 182 pp.

Al-Shamma'a, A.A and Jasim, Z.M. (1993). The natural food *of Liza abu* during the flood in Al-Hammar Marsh, South Iraq. Zoology in the Middle East, 9:59-64,

Alseyab, A.A. (1988). Ecology and Biology of the Asiatic Catfish *Sifurns triosegits* Heckel, 1843 (pisces Siluridae) from Al-Hammar Marsh Southern, Iraq. MSc. Thesis, Univ. Basrah, 121 pp. (In Arabic).

Daoud, A.M.H.; AI-Rubai R.K. and Hammadi. A.A. (1999), On the food and feeding habits *of Si/urns glanis* L. in Al-Gharraf. Ibn Al-Haithaam J. Pure &Appl. Sci., 12(2): 9-21.

Dipper F., Brdges.C. and Menz, A .(1977). Age, growth and feeding in the ballon wroune *(Labas becgylia* Ascanius ,1767). J. Fish Biol, 1 1:105-120.

Gordon, J.D.(1977) The fish population in inshore waters of the west cost of Scotland. The food and feeding of the whiting *(Meriangius melangus}.* FishBioL, 11:513-529.

Hammady, A-R A-H. (1995). Studies on Some Aspects of the Biology of Two Fish *Sihims triostegus* and *Cyprinus carpio* L. from AI-Garraf Canal. M. Sc. thesis, Coll. Edu. (IbnAl-Haitham). Univ. Baghdad. 137pp, (In Arabic).

Horn, H.S.(1966). Measurement of overlap in comparative ecological studies. Amer. Nat, 100:419-424. Hyslop, E. J. (1980). Stomach contents analysis, A review of methods and their application. J. Fish Biol. 17:41-429. Johal, M.S. (1981). Food of some fishes of Punjab. Vest Cs. Spolec. Zool. 45:87-93.

Khalaf, A.W.; Allouse, S.B.; Alyamour. K.Y.; Al-Jafary.A.R. and Sadek, S.E. (1987). Food and feeding of the catfish *Heteropmusies fossilis* (Bloch) from a polluted river. J. Environ. Sci.Health. A22(5): 397-410.

Pandian, T.J. (1966). Feeding and reproductive cycles of the fish *Mysfus gii/lo* in the cooum back wadras. Madras. Indian J. Fi'sh, 13 (1 & 2): 322-333.

Zaret, T.M. and Rand, A.S.(1971). Competition in tropical stream fishes support for the competitive exclusion principle. Ecology, 52:336-342.

مكونات الغذاء لثلاثة أنواع من اسماك الجري في هور الحمار، مدينة الفهود - العراق

عامر علي الشماع

قسم تغذية الحيوان ، دائرة البحوث الزراعية وتكنولوجيا الغذاء ، وزارة العلوم والتكنولوجيا

ص.ب 765 ، بغداد – العراق

الخلاصة

درس المحتوى الغذائي لمعد ثلاث انواع من اسماك البحري (catfisfes) ، هي الجري الاسيوي *Silurus triostegus* (Heckel, 1843) وابو الزمير *Mystus pelusius* (Solander in Russll, 1794) وابو الحكم *heteropeustes fossilis* (Bloch, 1794). صيدت الاسماك من مياه هور الحمار بالقرب من مدينة الفهود في محافظة ذي قار خلال المدة بين اذار 1989 وشباط 1990 . كونت الاسماك الصغيرة وبقاياها نسبة 70.7% من حجم الغذاء الموجود في معدة سمكة الجري الاسيوي وحصلت على 83.2% حسب دليل مستوى الاهمية. اما الروبيان ويرقات الحشرات فجاءتا في مقدمة الغذاء لسمكة ابو الزمير ممثلة 74.7% و 59.4% من حجم الغذاء المتناول وحسب دليل الاهمية على التوالي. اما سمكة ابو الحكم فقد وجد ان المواد العضوية والمواد غير الغذائية تشكل 51.9% و 86.9% من المحتويات المتواجدة في معدتها حسب الطريقة الحجمية ودليل مستوى الاهمية على التوالي وكانت سمكة ابو الزمير الاكثر نشاطاً في التغذي.