STUDIES ON THE FRESH WATER FISH (BIZZ), *BARBUS ESOCINUS* CAUGHT FROM MOSUL DAM LAKE, IRAQ

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Abstract

A total of 79 specimens of bizz, *Barbus esocinus* were subjected to an investigation a period between June 1993 – May 1994. The investigation includes examination of gastrointestinal contents, length-weight relationship and the condition factor, and parasitic investigation.

As concern the gastro-intestinal food contents, the main bulk of contents are small fishes (75%) such as *Acanthobrama marmid*, *Liza abu* and *Alburnus pallidus* and larval cestodes, *Ligula intestinalis* which were found among semi-digested food along with bones of fishes in addition to Cyclops and *Diaptomus*. Small hard parts were found such as wings and antennae of insects (about 10 %) with mucous and digested food.

Length-weight relation was found to be as the following equation:

Log W= -1.69 + 4.23 Log L

This means that growth of fishes is allometric and not isometric as it exceeds the number 3. The condition factors was calculated and found as K=1.13.

A significant correlation was found between the age and the mean of total length, standard length, width, mouth opening, head length, intestinal length, gonad length, weight of fishes. Generally, values of the above mean increased as the age increased which indicated that the growth of fishes is normal.

Three species of parasites were recorded, one monogenean *Paradiplozoon barbi* , one cestode, *Bothriocephalus acheilognathi* and one crustacean *Pseudolamproglena annulat*a. Noteworthy, *B. esocinus* was regarded as a new host for both *P. barbi* and *P. annulata* in Iraq.

Key words: fish, gastro-intestinal content, condition factor, parasites

Introduction

Studies on condition factors of fishes were carried out as early as sixties, on *Barbus grypus* , *B. sharpeyi*, *B. xanthopterus* (Al-Hamed, 1966, a,b). Detailed study was performed on fishes present in Al-Tharthar reservoir by Ahmed (1974) , among fishes investigated were *B. grypus*, and *B esocinus.*

In Mosul district Dawood (1976) studied the condition factors of the freshwater fish, *Varicorhinus trutta* . Al-Hakim *et al.* (1981) studied determination of age, growth, and sexual maturity of *Barbus grypus* in Dokan reservoir in northern Iraq. Al-Shamma"a and Jassim (1993) investigated the food content of the Freshwater fish, *Liza abu.* Furthermore, The freshwater fish, *Chondrostoma regium* living in river Tigris near its connection with Diyala River was also investigation (Al-Shamaa ,1994).

Some interesting study was performed, but on marine fishes of Yemen, as Age and growth of the pink ear emperor, *Lethrinus lentjan* in the red sea coast of Yemen was studied, a power relationship was estimated between total length and total weight for females (b= 2.986]) males (b= *2.959)* , they believed that the condition factors are influenced by spawning cycle where higher values of condition factor were observed in spawning period and lower values were observed after spawning and resting periods (Al-Areeki *et al.* 2007).

Previous Parasitological studies on bizz, *B. esocinus* parasites, started by Herzog(1969) who recovered three species of protozoan parasites and three species of the nematodes, *Contracaecum, Goezia*, *Dujardinascaris*. Rasheed (1989) was able to found a myxosporidian *Myxobolus pfefferi* from *B. escocinus* living in lesser Zab river northern of Iraq near Alton Kopry. Ali (1989) recorded four parasites in *B. esocinus* in fishes of Greater Zab river in Asky-Kalak town northwest of Erbil city, these parasites are: *Myxobolus pfeifferi* , *Dactylogyrus vastor*, metacercaria of *Diplostomum* sp. , and a crustacean *Lamproglena pulchella*. Abdul-Ameer(1989) recorded some parasites in Tikrit city. Rahemo and Ami(1991) recorded the cestode, *Bothriocephalus gowkogensis* in *B. esocinus* living in river Tigris, Mosul.

The present investigation aimed to investigate the intestinal contents of the fish as well as the condition factor of *B. esocinus* living in Mosul Dam Lake and surveying different parasites infecting this fish, as part of a comprehensive investigation performed in this region (Rahemo *et al.*,1994).

Materials and Methods

A total of 79 fish were caught from Mosul Dam Lake starting from June 1993 till end of May 1994. After fishes were brought to the laboratory, total, standard length, maximum width, head length, mouth width, intestine length, gross weight, length and width of gonads were measured. In order to find a relation between the length and the weight the following equation was used as cited by Ahmad (1974; 1990):

Log a= ∑ (Log w ∑(Log L) -2∑ Log L Log∑ L. Log w)/ N.∑ (Log L) 2- (∑ Log L)2

After calculating the value of Log (a), the following equation was used to estimate value of b.

b = ∑(Log w) –(N. Log a) / ∑ Log L

For condition factor:

K=100W/L 3

Intestinal contents were examined grossly and microscopically, especially at its anterior part and also gonads to determine its maturity. For age determination scales were removed from the dorsal fin and lateral line skin and gills were also examined.

For parasites examination, skin , gills, and fins, were examined from outside carefully and gills were removed and put in Petri dishes in proper physiological saline to detect parasites. In addition to examination of the liver, air bladder, kidneys, ovaries, testes, were also examined for detecting larval or encysted parasites. Blood smears were also taken fixed in methanol then stained in Giemsa stain and examined under microscope while helminthes were fixed in 4% formalin then stained with haematoxyline-eosin or acetocarmine. Data of body condition were analyzed using Dunken multiple test to determine the average effect of age on these parameter.

Results and Discussion :

gastro-intestinal contents:

After examining the gastro- intestinal contents of the fishes the following status was found:

Stomach status	Number of fishes	Percentage
Full	22	27.8%
Semi-full	40	50.6%
1/4 full	6	13.9%
Empty	6	7.6%

As the stomach was half filled especially with small fishes which indicates that the nutrients in Mosul Dame lake, is suitable for bizz culture. If a comparison is made to the results of Dawood (1976) in (ethry) *Varicorhinus trutta* , we see that the examined fishes were full with 50% while the rate does not exceed 27.8% in bizz fishes. It is difficult to interpret ate the results as there is no ecological studies neither on bizz or ethry in the bottom of river Tigris or Mosul Dam lake. Possibly the differences exist between the two species of fishes are due to different feeding habits as bizz known as predator while ethry is herbivorous fish (Dawood, 1976).

The most important constituents of the intestinal contents are:

1- Small fishes which were semidigested , these fishes were identified as : arath, *Acanthobrama marmid*, kishni, *Liza abu*, *simnan* ,*Alburnus pallidus* , which constitute about 75% of intestinal contents.

2—Dead cestodes larvae, *Liguala intestinalis*, possibly these were in the body cavities of the victim fishes.

3-Some crustaceans such as Cyclops, *Diaptomus* sp. remnants of some insects such as legs, antennae, etc.

4—Green aquatic plants with 7%.

5—Small stones and sand granules 6%.

6—Digested materials, mucous, and others 5%.

After comparing the present results with those of Al-Shamma"a and Jasim(1993) as they

studied the natural food of *Liza abu* during the Flood of Al-Hammar Marsh, zooplankton was (20.2%), phytoplanktons (11.5%) while sand grains (47.5%). Furthermore, Al-Shama (1994) when investigating *C. regius* it was found that phytoplanktons are most abundant as food contents constituting approximately(26%) while soil represent 47% of ethry (Dawood, 1976) this differences depends on fish feeding habits as bizz fishes are predators mainly on small fishes living around therefore, it seem difficult to culture bizz in pond by using artificial feeding.

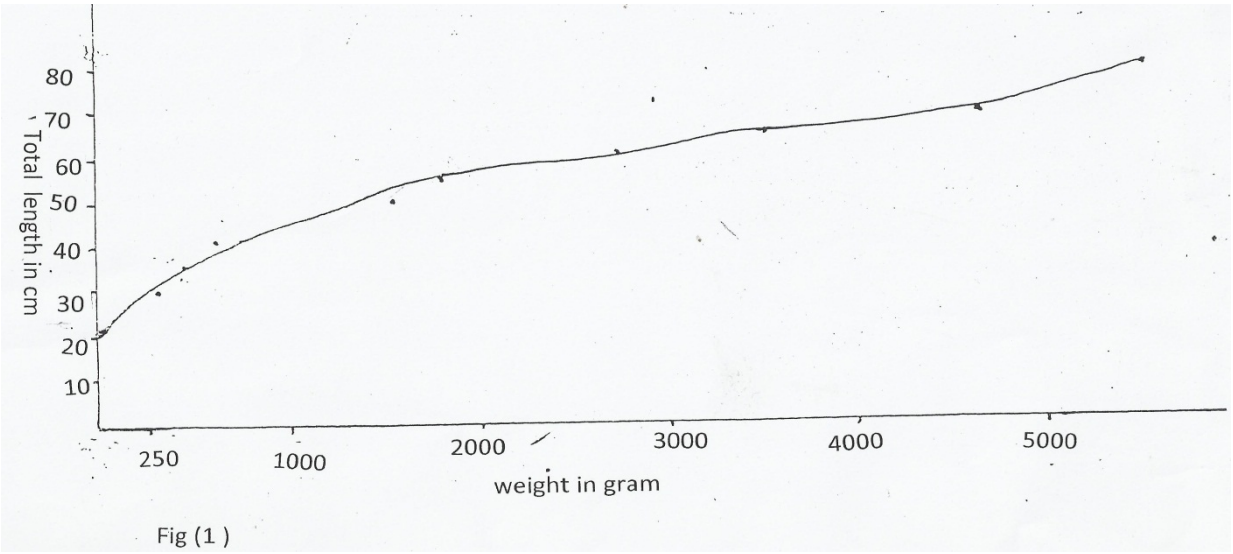
Length-weight relationship:

Body lengths of fishes ranged from 25 -75 cm and their weight from 100 – 5500 g. (Fig.1 and Table 1), the relation between length and weight was calculated as in the following:

Log W= 1.69 +4.23 10Log L

After finding value of Log **a** and value of **b.** This enable us to conclude that the growth of these fishes is allometric , not standard as value of **b** increases more than **3**. While Ahmad(1974) in his study of bizz in Tharthar lake found that the value was closer to the standards value as shown in the following:

Log W= 4.4829 $_{+\ 2.9892}$ Log L



Fig(1): The relation between Length(cm) and Weight (g)of Fishes examined

Such difference may be related to two different habitat of the fishes as they live in two different regions.

The relation between the length and the body weight in ethry, V. *trutta* was as in the following equations :

Log W= -0.36 +2.397 Log L for males

Log W= -0.026 + 1.556 Log L for females

As reported by Dawood(1976) that the **b** value is far from **3** which indicated that ethry fishes growth is not in standard especially the females.

The increase in condition factor found in the present study as weight increases is similar to results of Al-Hakim et al. (1981) in shaboot, *B. grypus* living in Dokan Dam reservoir northern of Iraq. While the results of Ahmad (1974) for bizz of Tharthar lake was 0.9023 this indicates that fishes in Mosul dame lake gain more weight than those found in Tharthar lake of the same age, it is also better than the shaboot and katan *B. xanthopterus* studied by Al-Hamed(1966 a) and Dawood (1976) who found the condition factor range between 0.9283 -1.4 in males and 0.889 -1.32924 in females respectively . High condition factor also found by Hussain *et al.* (1987) during their studies on condition factors of kishnii fishes, *L. abu* in river Kartheh in Arabstan, Iran, and they claimed that this high level is high due to the swelling of abdomen as condition factor was low in slender fishes.

Relation between age and Lengths:

As shown in Table (2) the age of fishes have a positive relation with mean length, standard length, maximum width , head length, length of intestine, weight of gonads and total weight of

the fish . All these parameters increased when age increases and reached its maximum when age reached 6 years this mean that growth of bizz fishes in this lake is normal and there is no factors preventing growth.It is important to note that the growth and mortality rates of *Cyprinus carpio* and *Aspius vorax* in Diyala river, south of Baghdad were studied by Al-Rudainy and Abbas(2007) .Among their outstanding results, the regression coefficient (b) values of length-weight relationship indicated that the growths of these two species are allometric, *C. carpio* grew less in weight than in length. Mean condition factor k of *C. carpio* was 1.02 and for *A. vorax* was 1.08, which are more close to the present results of bizz fishes in Mosul Dam lake which is also concluded that it is allometric.

Parasites of bizz, *B. esocinus:*

1- Examination of blood films did not show any haematozoas

2- Helminths: two species were found, these are:

Paradiplozoon barbi : this worm found in one fish with a mean infection rate of 1.2%. Two worms are united each of them 5 -6 mm, each worm is divided into two regions anterior prohaptor 3-4 mm and a posterior haptor 2-3 mm in length. the anterior part bear anterior suckers while the posterior bear 4 pairs of clamps, the length of each clamp is about 0.17 mm and its width 0.013 mm, these clamps are used for attachement.

It is noteworthy that three species of *Paradiplozoon* were found on Iraqi fishes namely *Paradiplozoon kasimii* in the gills of *Cyprinion macrostomus* (Rahemo, 1980), and on himri, *Barbus leuteus*(Ali *et al.*1987) and the second species *P. pavlovskii* from shelak, *Aspius vorax* (Mhaisen *et al.*1986)and third species is *P. barbi* occurred in zoly fishes, *Chondrostoma regius* (Rasheed *et al.*1989).The characters reported in this fish is similar to those given by Rasheed *et al.* (1989). Possibly these three species are synonemous. It is noteworthy that the index-catalogue of parasites of fishes in Iraq includes ten species of *Paradiplozoon* and two species of *Diplozoon* and one species of *Eudiplozoon* (Mhaiesen, 2012). Anyhow, *P. barbi* was reported from Dokan Dam lake, Lesser Zab and Greater Zab Rivers (Abdullah, 1990; Abdullah and Mhaisen, 2004).

2-***Bothriocephalus acheilognathi:*** two specimens were found in the intestine , with total incidence of 2.5% .Long worm 10 -20 cm, the scolex reach 1.48 mm in length and 1.6 mm in width, the neck is 1.3 mm in length 1.5 in width and the mature proglottid 0.67 mm X0.38 mm ,gravid segment 0.38 X1.9 mm.

Three species names of this worm have been given namely, *B. gowkongensis*, *B. opsariichthydis*, and *B. acheilognathi* which were collected from different fishes and from different regions in Iraq (see Khalifa, 1982; Mhaisen, 1992;2012; Mama, 2012). Anyhow Molnar (1977), Scholz (1989) and Hoffman (1998) considered both *B gowkongensis* and *B. opsariichthydis*in as synonyms of *B. acheilognathi.*

Pseudolamproglena annulata:

Two specimens of this crustacean were found in the gills of one fish, with incidence 1.2%. The total length 5-6 mm a swelling was found in the middle of the body approximately 1.26 in length and 0.45 mm in width and in female specimen the ovigerous female egg sac was found as two strips 4.63 mm in length and 0.21 mm in width and in each strip there are 27-30 eggs. This species was described for the first time in fishes of Iraq by Boxshall(1976) in *Cyprinion macrostomus L. pulchella* from little zab (Rasheed and Hussain, 1988), While Mhaisen et al. (1986) when studing Mehaijeran Greek River they recorded *L. pulchella from* from shelak *A. vorax*. Rahemo(1977) recovered this parasite from *Chondrostoma regius and Varicorhinusa trutta*. Some authors authors believe that *L. pulchella* do not exist but *Pseudolamproglena annulata,* as differences between the two are very small. This recording is as first time in *B. esocinus* while Ali (1989) recorded it in Great Zab river passing through Asky-Kalak town north west of Erbil city, but from *Barbus luteus* , and *Cyprinion macrostomus*. Further studies need confirm synonymy or there are two separate species exist . Anyhow the present finding represent the first report from bizz fishes, *B. escocinus.*

Table (1) : The relationship between the length and weight of and coefficient of conditions for 79 fish of *Barbus esocinus*

Total length	The weight		Number of fishes	Coefficient Conditions
	The range	the average		
25	100 – 150	125	8	0.8
30	200 – 300	260	9	0.96
35	400 – 500	455	15	1.06
40	550 – 700	630	11	0.98
45	900 – 1200	1055	8	1.15
50	1350 – 1750	1530	8	1.22
55	1750 – 2000	1875	2	1.12
60	2400 – 3000	2740	7	1.26
65	320 – 3800	3500	7	1.35
70	4000 – 5300	4650	2	1.35
75	5400 – 5600	5500	2	1.30
				The average : 1.13

Table (2) : General characters (parameters) for different ages of *Barbus esocinus*. Each number is an average of 10 values.

Age (year)	T.L. (cm)	S.L. (cm)	L.W. (cm)	M.O. (cm)	H.L. (cm)	I.L. (cm)	G.L. (cm)	G.W (gm)	T.W. (gm)
1	28 c	24 c	5.5 d	1.8 d	6 d	32 e	5 d	2 e	200 c
2	33 c	28 c	7.5 Cd	2.2 c	7.5 cd	43 de	10 cd	5 e	350 de
3	38 b	32 c	8.5 Bc	2.5 cd	8.5 cd	51 cd	13 c	11 d	475 d
4	47 b	40 b	10 bc	3.01 bc	9.5 c	65 bc	16 bc	22 c	760 c
5	55 a	47 a	12 ab	3.7 ab	13 b	71 b	20 b	33 b	1800 b
6	65 a	56 a	15 a	4.5 a	4.5 a	116 a	28 a	53 a	4200 a

Numbers with the same letter (s) among each column do not differ significantly according to Duncan multiple test at probability level 0.1%.

T.L.= Total length, S.L. ,= Standard length, L.W.= Larger width, M.O.= Mouth opening, H.L.= Head length, I.L.= Intestine length, G.L.= Gonad length, G.W.=Gonad weight and T.W.=Total weight.

Note : Ten samples were selected for each age in this table to become homogeneous samples, in order to be analyzed and because the maximum age for some samples did not exceed ten samples.

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دراسات على سمكة المياه العذبة(البز) *Barbus esocinus* المصطادة من بحيرة سد الموصل–العراق

الخلاصة :

تم فحص ٧٩ نموذج من أسماك البز التي استيطدت من بحيرة سد الموصل الفترة مابين حزيران ١٩٩٣ – أيار ١٩٩٤، شملت الدراسة التقصي عن محتويات القنات الهضمية والعلاقة ما بين الطول والوزن و معامل الحالة.

فيما يخص المحتويات الغذائية في القناة المعدية المعوية فقد وجد ان هذه المحتويات غالبا أسماك صغيرة(٧٥%) مثل أسماك العراض *Acanthobrama marmid* والخشني *Liza abu* والسمنان الباهت *Alburnus pallidus* ويرقات الديدان الشريطية *Ligula intestinalis* التي وجدت مع العظام شبه المهضومة (٧%) وكذلك بعض القشريات مثل Cyclop و *Diaptomus* وبقايا بغض الحشرات مثل الارجل وقرون الاستشعار(١٠%) ومواد خضراء أغلبها نباتية(٧%) وأحجار صغيرة وأتربة(٦%) مع مواد مهضومة مخاطية ومواد أخرى(٤%). أما عن علاقة الطول بالوزن فقد لوحظ أنها تتمثل بالمعادلة التالية:

$$\text{Log } W = -1.69 + 4.23 \text{ Log } L$$

وهذا يعني بان نمو الاسماك هو من نوع المتجانس allometric اي ليس قياسيا حيث زادت القيمة عن ٣. أما معامل الحالة فقد وجدت كالاتي:

$$K = 1.13$$

بعد التحليل الاحصائي تبين بان عمر الاسماك يوثر معنويا على متوسط الطول الكلي والطول القياس وأكبر عرض وفتحة الفم وطول الراس وطول الامعاء وطول المناسل ووزن السمكة الكلي وبصورة عامة أزدادت قيم جميع الصفات مع تقدم عمر الاسماك مما يشير الى ان النمو في الاسماك هو نمو طبيعي.

تم تسجيل ثلاثة أنواع من الطفيليات، نوع واحد من أحادية المنشا هو: *Paradiplozoon barbi* ونوع واحد من ألديدان الشريطية هو: *Bothriocephalus acheilognathi* ونوع واحد من القشريات الطفيلية هو: *Pseudolambroglena annulata*. في هذه الدراسة أعتبرت أسماك البز مضيفا جديدا لدودة أحادية المنشا *Paradiplozoon barbi* والقشري *Pseudolambroglena annulata* .