

Some Ecological Aspects Of The Acanthocephalann *Pomphorhynchus spindletruncatus* Parasitic In *Barbus xanthopterus* From Lesser Zab River In North Of Iraq[♦]

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الخلاصة

تم جمع عينات شهرية من سمكة القطان *Barbus xanthopterus* خلال المدة من شهر تشرين الثاني 2000 ولغاية نهاية تشرين الثاني 2001 من نهر الزاب الصغير في شمال العراق. كانت الأسماك مصابة بالعدوى شوكية الرأس *Pomphorhynchus spindletruncatus*. كانت نسبة الإصابة 28.1%. لم تظهر فروق معنوية في إصابة ذكور وإناث الأسماك بهذا الطفيلي. كما لوحظ حصول زيادة في نسبة ومعدل شدة ووفرة الإصابة بزيادة طول الأسماك. كانت الإصابة عالية خلال أشهر الربيع والصيف، وواطنة خلال أشهر الخريف والشتاء.

ABSTRACT

Monthly samples of the cyprinid fish *Barbus xanthopterus* were collected from Lesser Zab river, north of Iraq during the period from November 2000 until the end of November 2001. Fishes were found infected with the acanthocephalan *Pomphorhynchus spindletruncatus*. The rate of infection was 28.1%. No significant differences were noticed between male and female fishes infected with this parasite. Prevalence, mean intensity and abundance of infection with *P. spindletruncatus* increased with the increase of fish length. Infection rate was high during Spring and Summer, and low during Autumn and Winter.

INTRODUCTION

Pomphorhynchus spindletruncatus Amin, Abdullah et Mhaisen, 2003 was described from north of Iraq. It is the second species of *Pomphorhynchus* recorded from northern Iraq (1). The other species is *P. laevis* (Müller, 1776) found in Dokan lake (2).

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The acanthocephalan *P. spindlet truncatus* is a widely distributed intestinal parasite in two cyprinid fishes: *Aspius vorax* and *Barbus xanthopterus* in the north of Iraq. The infection is often very high (range of prevalence 33.3- 93.3%) and it is generally considered to be pathogenic to its fish host (1).

Differences in the environmental factors, seasonal abundance of fish parasites, level of infection and other macro- and microenvironmental factors, as well as host age and sex, also play a part in determining the susceptibility of fish to diseases (3). Such informations are important for management applications to disrupt the parasite life cycle in its weakest points (4).

In Iraq, some biological and ecological information about the acanthocephalans parasitizing freshwater fishes were published. Information reported in such investigations included the seasonal changes of infection with host age, site of attachment, geographical distribution, and correlation of infestation with host sex from Shatt Al-Arab river in Basrah city (5), from Mehajjeran creek in Basrah city (6), from Greater Zab river near Erbil city (7), from Euphrates river (8) and from Dokan lake (9). As no previous account was published on the ecology of *P. spindlet truncatus* in Iraq from *B. xanthopterus* which is one important commercial freshwater fish in Iraq, the present work was thought of importance to be conducted .

MATERIALS AND METHODS

Study area: The Lesser Zab river is a large river (400 km), located about 45km south of Erbil City, in north of Iraq. It is situated between 34°- 36° north latitude and 43°- 46° east longitude. The sampling area in this study is located near Alton Kupri City (10).

Sampling: Monthly samples of the fish specimens were taken by gill netting, cast netting, electrofishing or hook by local commercial fishermen during the period from November 2000 until the end of November 2001.

Specimens were placed in plastic tanks with local river water and immediately transferred to the laboratory and were examined within 24 hours after their capture. However, some specimens were deeply frozen and examined within one week (11).

In the laboratory, a sample of live fish was sacrificed by pithing. Their total length, standard length and weight were measured and sex was determined. Fishes were opened from the abdominal site, the stomach and intestine were dissected out and placed in separate Petri dishes with physiological saline. All parts were thoroughly examined under a binocular microscope. Acanthocephalans found in the host were first washed in saline solution, refrigerated in cold water for 12 hours, and

then fixed in 70% ethanol. Worms were stained with Mayer's acid carmine, dehydrated in ascending concentrations of ethanol, cleared in xylene and whole-mounted in Canada balsam (1).

During the study period, data on acanthocephalans were categorized according to sex of hosts and months of collection. Similarly, data were divided into three groups on the basis of host fish length (15–20, 21–26 and larger from 26 cm).

The terms of prevalence (percentage incidence), mean intensity and abundance of infection were used according to Margolis *et al.* (12). For testing differences in prevalence, intensity and abundance of infection between fish sexes and length groups, two tests (t- test and complete randomized design) were conducted (13).

RESULTS AND DISCUSSION

A total of 96 *B. xanthopterus* from Lesser Zab river were collected during the present study. Intestines of these fishes were infected with *P. spindlet truncatus* (Fig. 1). The overall prevalence was 28.1%, the mean intensity was 14.4 and the abundance was 4.3 (Table 1).

Variations in Infection with Host Sex

Table (1) indicates that males and females of *B. xanthopterus* from Lesser Zab river showed no significant differences in their infection rate with *P. spindlet truncatus* ($t=0.31$ at $P<0.05$). For this reason, data for both sexes were pooled for further analysis. The present result agrees with that of Kennedy (4) who noted that many workers showed absence of any difference in the infection of both sexes with most parasites.

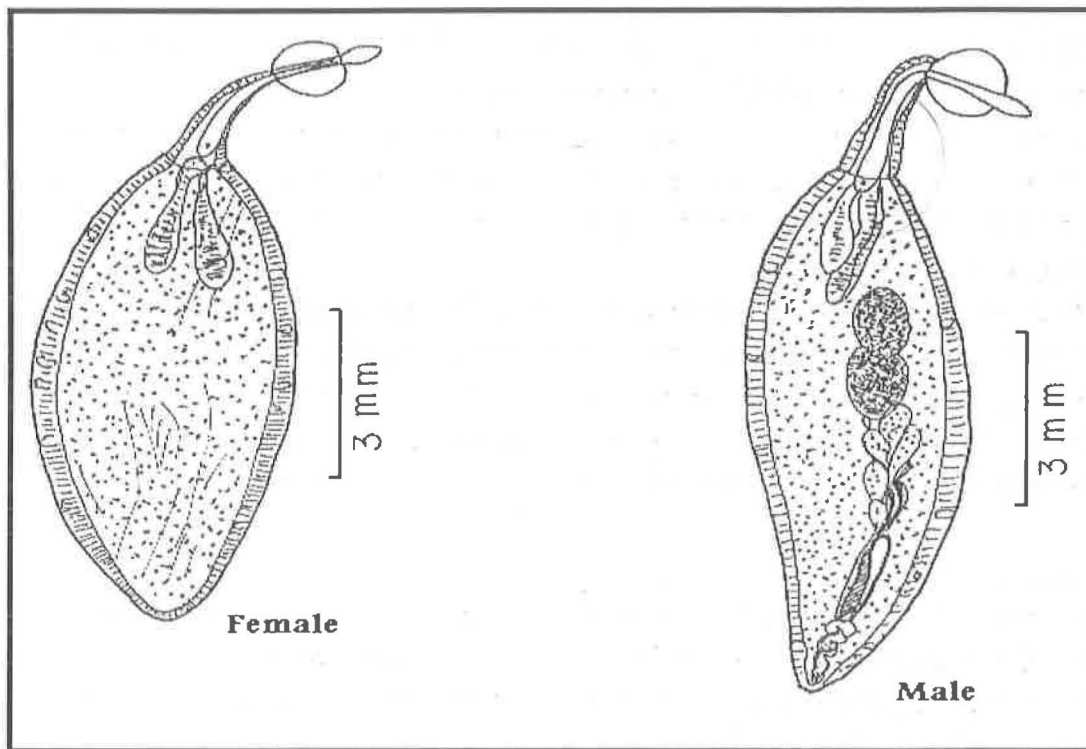


Fig. (1): Camera lucida drawings of *Pomphorhynchus spindlet truncatus*.

This result also confirms observations of Ali (7) on *Neoechinorhynchus rutili* of *Barbus esocinus* in Greater Zab river. The similarity of the food and feeding habits of males and females of fishes and their occupancy of the same habitat (14) may explain the absence of any difference in the parasitic fauna acquired with food of both sexes. Living in the same habitat and the absence of morphological differences between both sexes of fishes may also provide evidences on the similarity of the infection with parasites as well. However, some authors gave examples on the presence of such differences between males and females (9, 14) due to differences in food behavior and morphological differences between both sexes.

Table 1: Changes of the infection of different sex of *B. xanthopterus* with *P. spindlet truncatus* from Lesser Zab river.

Fish sex	No. Fish		Prevalence (%)	No. parasites	Mean intensity	Abundance
	examined	infected				
Male	49	14	28.6	210	15.0	4.3
Female	47	13	27.7	178	13.7	3.8
Both	96	27	28.1	388	14.4	4.0

Variations in Infection with Host Length

The present resultsshowed an increase in the infection rate of *B. xanthopterus* with *P. spindletruncatus* with the increase of fish length. The intensity and abundance of infection was high (6.2 ± 2.7) in the largest fish length group (larger from 26cm). The statistical analysis showed no significant differences($p=0.05$) between the groups of fish length (Table 2).

The increase in the infection rate with *P. spindletruncatus* can be attributed to the accumulation of the infective stages consumed with the intermediate host, or may result from a relatively stable host feeding behavior in all ages. This agrees with the results found by some researchers in Iraq for *N. rutili* in *B. esocinus* (9) for *N. iraqensis* in *Liza abu* (16), and for *N. rutili* in *B. barbus* of the Jihlava river, Czech Republic (17)

Table 2: Changes of the infection rate of different length group of *B. xanthopterus* with *P. spindletruncatus* from Lesser Zab river.

Fish length group (cm)	No. fish examined	No. fish infected	Prevalence (%)	No. parasites	Mean intensity	Abundance \pm SD
15-20	17	3	17.6	16	5.3	0.9 ± 0.5
21 – 26	41	12	29.3	138	11.5	3.4 ± 1.9
Larger from 26	38	12	31.6	234	19.5	$6.2 \pm 2.7^*$

* Highest infection

Seasonal Variations in Infection

It is apparent that *P. spindletruncatus* occurred in *B. xanthopterus* throughout the year except November and February, with a prevalence attaining of 10-87.5%. The infection of *B. xanthopterus* with this parasite in Lesser Zab river showed significant differences ($p=0.05$). The abundance of infection (Table 3) was highest during July (20.9 ± 1.7), and lowest during September (0.7 ± 1.2).

The increase in infection rate with *P. spindletruncatus* during Summer may be the result of abundance of a large number of the intermediate hosts in the water (18) and the increase in the feeding activity of the fishes. The low infection rate during Winter can be attributed to both lower feeding activity of the fishes and the rarity of larval stages that infect fishes (19). Similar trends in the fluctuations in prevalence were noted in case of *N. agilis* from *L. abu* in Mehajieran creek, in Basrah city (6) and *N. rutili* from *B. esocinus* in Dokan lake (9).

The findings of this study also confirm the suggestion made by Granath and Esch (20) that seasonal changes in abundance of fish parasites are influenced by a variety of factors including temperature and food consumption.

Table 3: Monthly fluctuations of the infection of *B. xanthopterus* with *P. spindlet truncatus* from Lesser Zab river.

Month	No. fish examined	No. fish infected	Prevalence (%)	No. parasites	Mean intensity	Abundance \pm SD
Nov. 2000	6	0	0	0	0	0
Dec.	10	2	20	18	9	1.8 \pm 2.2
Jan. 2001	8	2	25	19	9.5	2.4 \pm 2.5
Feb.	6	0	0	0	0	0
Mar.	9	2	22.2	14	7	1.6 \pm 1.6
Apr.	9	2	22.2	25	12.5	2.8 \pm 3.3
May	8	2	25	34	17	4.3 \pm 4.9
June	8	3	37.5	49	16.3	6.1 \pm 3.7
July	8	7	87.5	167	23.9	20.9 \pm 1.7*
Aug.	8	5	62.5	47	9.4	5.9 \pm 2.0
Sept.	10	1	10	7	7	0.7 \pm 1.2
Oct.	6	1	16.7	8	8	1.3 \pm 1.3

* Highest infection
LSD = 1.20.

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