

Effect of Host Species, Sex, Length, Diet and Different Seasons on the Parasitic Infection of *Tilapia* Fish in Lake Manzalah

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ABSTRACT. *Tilapia nilotica*, *Tilapia zilli*, *Tilapia galilaea* and *Clarias lazera* were taken from Lake Manzalah to carry out this investigation. A total number of 264 *Tilapia* fishes and 50 specimens of *Clarias lazera* (as a comparative group) were examined for parasitic infection.

The effect of some factors, on the incidence of the parasitic infection on the host fish is carried out. The results of this study show that, 57.6% of the examined *Tilapia* fishes are infected with different types of parasites. These parasites are: Protozoa (*Trichodina*), Monogenea (*Dactylogyrus*) Copepoda (*Lernaea* and *Ergasilus*) and Acanthocephala (*Acanthosentis*). The prevalence of infection is highest in *Tilapia zilli* and lowest in *Tilapia nilotica*. Female fishes are heavily parasitized than males. The large sized fishes are more subjected to parasitic infection than smaller ones. A definite seasonal effect is noted for the three *Tilapia* species under consideration. Winter is found to be the season of severe parasitic infection of fishes, where the percentage of infection is obviously higher than the other seasons. The lowest percentage of infection is recorded in summer. The kind of food is a fairly factor in determining the type of helminth parasites which can be found in a fish.

Orientocreadium, a digenetic trematode is found in the intestine of *Clarias lazera* which is a carnivorous fish and of different mode of habits than *Tilapia* fishes.

Introduction

Tilapia is an important source of protein food for the Egyptian population. It provides about 70% of the total fish production in Egypt (El-Zarka 1961). Various ph-

pear during December-February. The PH value may be as low as 6.63 during June but during July it fluctuates between 7.24 and 6.88 in the different localities.

Material and Methods

A group of 264 *Tilapia* fishes of three different species: (*Tilapia nilotica*, *Tilapia zilli* and *Tilapia galilaea*) were caught from Lake Manzalah through the four different seasons of a whole year. The samples were random to fulfill lengths representing the different fish lengths in the lake. The seasonally collected fishes were brought alive to the laboratory. The total length, the sex and the identification of each fish were determined. The fishes were then examined externally and internally for any parasites. The parasites were collected, fixed and mounted for later identification (see Ramadan and Shakweer 1981). It is worthy to mention that 50 specimens of *Clarias lazera* were also taken from Lake Manzalah and examined providing comparative fauna for fishes of different feeding habits.

Data of the environmental conditions of the Lake Manzalah water were derived from El-Hehyawi (1977). Unfortunately the oxygen content of the water was not determined by the author due to some unavoidable difficulties.

Results and Discussion

All results concerning the parasitic fauna and host – parasite relationships for the three main *Tilapia* species dominant in Lake Manzalah namely *Tilapia nilotica*, *Tilapia zilli* and *Tilapia galilaea* are represented in Tables 1-4 and Fig. 1 and 2. A simple analysis of the data illustrates the following interesting points :

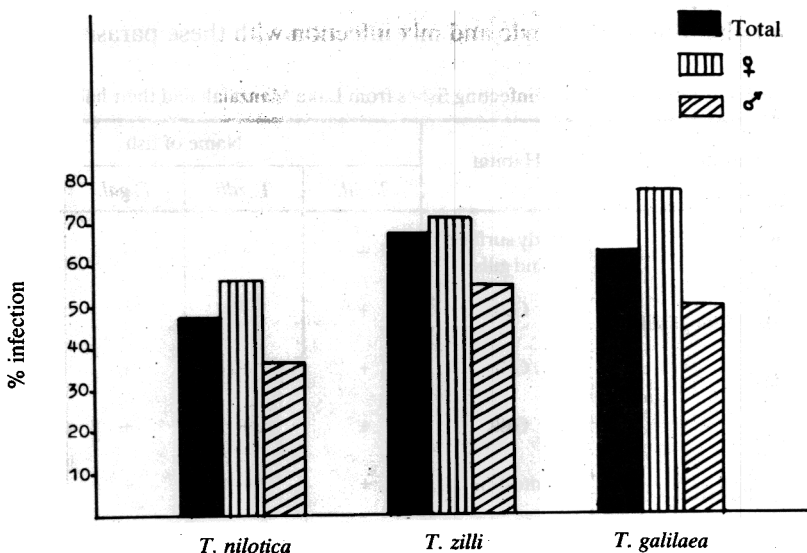


FIG. 1. Percentage of parasitic infection of different *Tilapia* fishes in Lake Manzalah.

served in *Clarias lazera* and *Tilapia* fish respectively. Ramadan and Shakweer (1981) examined *Tilapia* fish from Lake Mariut and Nozha Hydrodrom in Alexandria and recorded some other different parasites. This variation in the parasitic fauna of both localities may be attributed to the difference in the ecological and hydrobiological conditions of the two lakes. Nagibina (1957) showed that the hydrobiological conditions of a certain body of water affect its parasitic fauna both in the number of species and in the extent of infection. He mentioned that the change in the hydrobiological regime of Lake Vygozero created a change in the fauna of its living animals especially those inhabiting the bottom of the lake. Bauer (1959) proved that the hydrographical conditions of water play a major role in the development of its parasites.

Parasite-mix have been studied by Collard (1970). According to this author fishes exposed to infection by one parasite because of their diets, environment or other factors, are exposed to a number of other parasites. Physiological state of the fish can play a role in liability of the fish to be re-infected.

II. Effect of Host Species

Table 2 indicates that 57.6% of the total fishes examined, were found to be generally infected with different types of parasites. The percentage of infection was found to be maximum in *Tilapia zilli* and minimum in *Tilapia nilotica* where it showed 67.6% and 47.4% respectively. As for *Tilapia galilaea* the percentage of infection was 63.2% (Table 2 and Fig. 1). Therefore it may be concluded that in Lake Manzalah *Tilapia zilli* is more susceptible to parasitic infection and *Tilapia nilotica* is on the other hand less vulnerable to such parasitic infection. The variation in the percentage of infection in the three *Tilapia* species due to the host specificity or host preference was discussed by Ramadan and Shakweer (1981). Llewellyn (1956) showed that most of the monogenean gill parasites which he examined were found to be strictly specific to particular hosts. This author proved that there was an exacting topographical relationship between a parasite and its host, and this was probably an important factor in the mechanism of host specificity. Collard (1970) stated that certain host species might be more easily infected because of their physiological characteristics.

TABLE 2. Number of normal and infected *Tilapia* fishes in Lake Manzalah and percentage of infection.

Species of fish	Female		% of Inf.	Male		% of Inf.	Total		% of Inf.
	Nor.	Inf.		Nor.	Inf.		Nor.	Inf.	
<i>T. nilotica</i>	26	34	56.7	34	20	37.0	60	54	47.4
<i>T. zilli</i>	16	40	71.3	8	10	55.5	24	50	67.6
<i>T. galilaea</i>	8	28	77.7	20	20	50	28	48	63.2
Total fish examined	50	102	67.1	62	50	44.6	112	152	57.6
	152			112			264		

55.6%, 25.9% and 40% during winter, spring, summer and autumn seasons, respectively.

Regarding *Tilapia zilli* the highest percentage of infection was recorded in winter as 87.5% decreasing gradually to 72.7% in spring and 52.9% in autumn. In this species the lowest value of infection was detected in summer and was only 35.7%. As for *Tilapia galilaea* the percentage of infection was 72.7% in winter, 66.7% in spring, 28.6% in summer and 50% in autumn. It can be noticed from these data that the percentage of infection in the three fish species is more or less variable with the season of the year. The highest value of infection for each species was detected in winter season, followed directly by spring season and the lowest value was recorded in summer. This result coincides with that of Bauer (1957) who found that fishes suffered from high degree of parasitic infection only during hibernation when they are in a state of exhaustion. Lom (1970) also proved that the fishes are susceptible to heavy infestation with parasites mainly in the early spring where they are weakened by hibernation.

On a seasonal basis, Moharram (1980) said, "Autumn and winter are the two seasons in which we meet the biggest number of infected fish with copepods, as well as the greatest number of parasites per fish".

It has previously been suggested (Kennedy 1968) that the seasonal prevalence of *Caryophyllaeus laticeps* (cestode) in dace is related to changes in the fishes' resistance to infection such that it is at least in winter and greatest in summer. Kennedy and Walker (1969) strengthened this suggestion and indicated that the phenomenon may be due to changes in the immune response of fish at different temperatures. Lawrence (1970) suggested that seasons as with most ecological parameters, have varied effects on parasitic infection, depending on the species considered and the combination of the parameters in any given area.

V. Effect of Length

Since there is some sort of relationship between the length of the fish and its age, it is attempted in this part of the work to find the relationship between the length of the fish and the percentage of infected fishes. It is also to investigate which length of *Tilapia* is more infected with parasites than the others. The sizes of the normal and infected fishes of the three studied species of *Tilapia* are grouped in length classes (*i.e.* from 11 cm to less than 14 cm and from 14 cm to less than 17 cm and so on). Table 4 illustrates the percentage of infection of both the normal and infected fishes in each length group.

It can be concluded from the given data that the smallest fishes (length group from 11 cm to less than 14 cm) are relatively less infected than the other length groups for the three *Tilapia* species and the percentage of infection increases with increasing fish lengths.

It is concluded that, larger fishes are heavily parasitized than smaller ones. This finding agree well with that of Dogiel (1958) who showed that the intensity and pre-

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تأثير نوع العائل والجنس والطول والغذاء والفصول المختلفة على الإصابة الطفيلية في أسماك البلطي في بحيرة المنزلة

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المستخلص . استخدم في هذا البحث ٢٦٤ سمكة تنتمي جميعها إلى ثلاثة أنواع مختلفة من سمك البلطي الذي يوجد بكثرة في بحيرة المنزلة . هذه الأنواع هي سمك البلطي النيلي وسمك البلطي الزيلّي وسمك البلطي الجاليلي .

بفحص هذه الأسماك وجد أن ٥٧,٦٪ منها مصاب بأنواع مختلفة من الطفيليات . هذه الطفيليات تشمل أوليات ، ديداناً مفلطحةً أحادية العائل ، قشريات مجدافية الأرجل وديداناً شوكية الرأس .

وقد أوضحت الدراسة أن نسب الإصابة بالطفيليات المختلفة تصل إلى حدّها الأقصى في نوع البلطي الزيلّي ، وحدّها الأدنى في نوع البلطي النيلي ، كما وجد أن الإناث أكثر إصابة بالطفيليات من الذكور ، كذلك الأسماك ذات الأطوال الكبيرة تكون أكثر عرضه للإصابة بالطفيليات عن ذوات الأطوال الصغيرة من نفس النوع . كما أثبتت الدراسة أن موسم الشتاء هو أشد فصول السنة في نسبة إصابة الأسماك بالطفيليات وأن فصل الصيف هو أقلها .

ولمعرفة تأثير نوع الغذاء ، فُحصت خمسون عينة من سمك القرموط من نفس البحيرة للمقارنة إذ تمثّل نوعاً آخر من الأسماك من حيث طريقة المعيشة والتغذية ، وثبت أن نوع الغذاء يمثل عاملاً هاماً في تحديد نوع الديدان الطفيلية التي تصيب الأسماك ، إذ إن هذه الأسماك الأخيرة والمفترسة التغذية كانت مصابة بنوع آخر من الطفيليات المعوية وهو من الديدان المفلطحة الثنائية العائل .