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OBSERVATIONS ON THE HELMINTH PARASITES OF WILD AND CULTURED *TILAPIA* IN THE OKIGWE AREA OF IMO STATE, NIGERIA

O. M. UKPAI

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ABSTRACT

A total of 449 specimen of *Tilapia* comprising *Tilapia nilotica (Oreochromis)*, *Tilapia zilli* and *Tilapia galilaea (Sarotherodon)* collected from the Federal and State Fish ponds, Okigwe and from the Imo River were examined for heiminth infections. Out of these, only 5(1.1%) fishes were infected. These came from the wild. *Tilapia zilli* had the highest rate of infection (66.6%) while the prevalence rate of infection of *Tilapia* observed was (50.0%). Parasites recovered included *Euclinostomum heterostomum* (14.3%), *Paracamallanus cyathopharynx* (14. 3%) and *Caryophylleus sp* (42.8%). Comparing the infection rates of the fishes from the ponds (cultured) with the fishes from the open natural water system (wild), the wild fishes recorded a high rate of infection (50.0%) as opposed to no- infection recorded for the cultured fishes from the two fish farms. Only the males were infected among the infected fishes.

Key words: *Tilapia*, Wild, Cultured, Parasites.

INTRODUCTION

Mankind is loosing ground in the struggle to feed itself. Today, the limited quantity of food calories is a great concern to many parts of the under- developed world, but the quality notably of proteins is more crucial (Biswas, 1990). Proteins for human consumption come from two main sources viz plants and animals. Plant proteins are deficient in certain essential amino-acids– notably methionine, tryptophan and lysine which are necessary for healthy growth. Animal proteins on the other hand are rich in these amino acids, and are therefore, described as first class or good quality proteins. In the tropics, proteins obtained from livestock are generally expensive. Fish provides throughout the tropics a cheaper source of first class proteins for human consumption (Moses, 1983). Fish farming is increasing in importance as a means of converting protein which is not normally eaten by man into an acceptable edible product (Lloyd, 1992). In certain regions such as S.E. Asia and in several parts of Africa, fish is the most important source of animal protein (Edwards et al, 1991).

In many parts of the world, various parasite species infest fish thereby decreasing their yield and spoiling the quality of fish or rendering them aesthetically unacceptable (Awachie, 1965). Reservoirs and ponds are habitats in which conditions that favour the spread of parasites can occur by providing an ideal situation for them to grow and multiply, and by increasing the frequency of host-parasite contact through restriction of space for the fish. It can therefore be expected that there will be a high rate of infection under such man-made conditions. Apart from their effect on fish productivity, the need to study fish parasites is also important because some of them can be transmitted from fish to man. An early discovery of such parasites makes it possible to limit their spread as well as prevent their effects on the fish population. This work was therefore carried out to identify the helmimth parasites of wild and cultured *Tilapia spp* as parasites and fungi are known to cause the largest number of fish diseases (Pitcher and Hart, 1990).

O. M. UKPAI, Department of Biological Sciences, Michael Okpara University of Agriculture, Umudike, Nigeria

TABLE 1a: SIZES OF *TILAPIA SPP* EXAMINED FROM THE STATE FISH PONDS, OKIGWE.

FISH SPECIES	LENGTH RANGE (cm)	MEAN LENGTH (cm)	WEIGHT RANGE (g)	MEAN WEIGHT (g)	NUMBER EXAMINED	DESIGN-ATION.
TILAPIA ZILLI	7-10	8.5	25-35	30	18	Small
	11-14	12.5	60-70	65	12	Medium
	15-18	16.5	85-95	90	7	Large
TILAPIA NILOTICA	7-10	8.5	25-35	30	56	Small
	11-14	12.5	60-70	65	24	Medium
	15-18	16.5	85-95	90	40	Large

Table 1a shows that 3 sizes of fishes are represented while one species- *T galilae* was absent. In table 1b 3 sizes and 3 species of fishes are represented. However *T galilae* had the large size absent.

TABLE 1b: SIZES OF *TILAPIA SPP.* EXAMINED FROM THE FEDERAL FISH PONDS, OKIGWE.

FISH SPECIES	LENGTH RANGE (cm)	MEAN LENGTH (cm)	WEIGHT RANGE (g)	MEAN WEIGHT (g)	NUMBER EXAMIN-ED.	DESIGN-ATION.
TILAPIA ZILLI	7-10	8.5	25-35	30	50	Small
	11-14	12.5	60-70	65	12	Medium
	15-18	16.5	85-95	90	14	Large
TILAPIA NILOTICA	7-10	8.5	25-35	30	43	Small
	11-14	12.5	60-70	65	15	Medium
	15-18	16.5	85-95	90	9	Large
TILAPIA GALILAEA	7-10	8.5	25-35	30	28	Small
	11-14	12.5	60-70	65	11	Medium

TABLE 1c: SIZES OF *TILAPIA SPP.* EXAMINED FROM THE WILD (IMO-RIVER), OKIGWE.

FISH SPECIES	LENGTH RANGE (cm)	MEAN LENGTH (cm)	WEIGHT RANGE (g)	MEAN WEIGHT (g)	NUMBER EXAMIN-ED	DESIGN-ATION.
TILAPIA ZILLI	7-10	-	25-35	-	-	-
	11-14	12.5	60-70	65	1	Medium
	15-18	16.5	85-95	90	2	Large
TILAPIA NILOTICA	7-10	-	25-35	-	-	-
	11-14	-	60-70	-	-	-
	15-18	16-5	85-95	90	7	Large

TABLE 1c shows that only 2 species and only 2 sizes of fishes are represented. *T galilaea* was absent while the 2 species represented *T. zilli* and *T. nilotica* were not very abundant. *T. nilotica* had only 1 size of fish (Large) present.

Of importance also is the fact that the information on helminth parasites of *Tilapia* both in the wild and in fish farms (cultured) is difficult to come by. The little that is known is collected from the works of Awachie (1965) Khalil (1971 and 1973), Ukoli, (1965).

MATERIALS AND METHODS

The sites of study were the Federal and State Fish farms for the cultured *Tilapia* and the Imo River for the wild *Tilapia*, all in Okigwe area of Imo State. Okigwe is situated between latitudes $5^{o}4^{1}$ and $6^{o}3^{1}$N and longitudes

7°10' and 7°34' E. The ponds are situated in an open environment with low green grasses. The soil is clayey. The source of water to the farm is the Imo River.

SAMPLING

Cast nets or dragnets were used to capture fish from the ponds while the help of a local fisherman was employed to help capture fish from the wild. Fishes were handpicked, taken to be the laboratory and stored in different mini-aquaria from where they were picked and worked on. Sizes of the fishes were determined taking into account the total length, maximum width and weight. For the total length each fish was measured from the tip of the snout to the longest end of the caudal fin. Sexes of the fishes were also determined, using the presence of testes or ovary after dissection.

EXAMINATION FOR PARASITES

The examination for parasites was two fold. These were the external examination which involved the search for parasites on the external parts of the fish and the internal examination in which the gut was dissected out and separated into sections e.g. stomach, intestine, rectum). Contents of these were emptied into petridishes containing normal saline solution. They were examined for cysts, ova or whole worms using dissecting and binocular microscopes. Formal Acetic Alcohol (F.A.A.) Fixative and Borax carmine stain were used for the parasites as no cyst or ova were recovered.

RESULTS

A total of 449 specimens of *Tilapia spp* were examined. Of these only (1.1%) were infected. No cysts or ova were recorded. Results of this study are presented in the tables that follow

DISCUSSION

It is worth remembering the old adage which says "Prevention is better than cure." It is possible to devote more attention to preventing the occurrence of disease in fish. This is especially true for farmed fish, which tend to be at the mercy of all the extremes which their owners are capable of devising (Austin & Austin, 1989). There is surprisingly a low incidence of helminth parasites of *Tilapia* in Okigwe fresh water system, and absence of infection among the cultured fishes in the two fish farms. (Table2). This low record of helminth parasites must be attributable to the difficulty in collecting *Tilapia* in the open natural water system of this area. (Table1c). It does not however, mean that *Tilapia* in this zone is free of helminth infections as the prevalence rate of infection of fish examined was relatively high (50.0%). The absence of helminth parasites in the fish farms is significant and must be related to the anti-parasitic measures adopted by the management of the two fish farms. This is important because well kept and properly managed ponds usually contain healthy and thriving fish populations, provided the fry and fingerlings stocked were originally in good condition, while carelessness in stocking and feeding may result in serious parasitism, debility and subsequent mortality (Biswas 1990).

The infection rate observed in this study was similar to that observed by Awachie (1965) and Ukoli (1965) in the River Niger. This could be as a result of one or a combination of factors such as susceptibility, resistance and trophic relations as noted by Awachie (1965). The absence of endoparasitic helminths in the cultured fishes is in agreement with the findings of Khalil (1973) working on the helminth parasites of *Tilapia spp.* from an experimental pond at Kajansi, Uganda. Studies by Awachie (1965), Khalil (1971 & 1973), individually incriminated some helminth parasites especially monogenean trematodes as contributing to loss in fish productivity. Most of these studies also showed the prevalence rate of infection to be between 0-78%, a situation similar to the 50.0% prevalence of helminth infection observed in this study. Infection occurred mainly among the adult or large sized fishes (Table 3) which conforms with the findings of such workers as Chappel (1969) and

TABLE 2: PREVALENCE OF INFECTIONS IN THE *TILAPIA SPECIES*

SITE / FISH SPECIES	STATE FISH PONDS			FEDERAL FISH PONDS			IMO-RIVER (WILD)		
	N.E	N.I	%INF	N.E	N.I	%INF	N.E	N.I	%INF
TILAPIA ZILLI	37	-	-	76	-	-	3	2	66.6
TILAPIA NILOTICA	120	-	-	67	-	-	7	3	42.8
TILAPIA GALILAEA	-	-	-	39	-	-	-	-	-

OVERALL PREVALENCE RATE = 50%

NB: N.E = Number examined, N.I. = Number infected
%INF= Percentage of infection

Table 2 shows that no fish from any of the ponds was infected while the only infected fishes came from the wild.

TABLE 3: DISTRIBUTION OF PARASITES IN THE *TILAPIA* SIZE GROUPS FROM THE WILD

SIZE	N.E	N.I. with *E. heterostomum*	%INF	N.I. with *P. cyathopharynx*	%INF	N.I. with *Caryophlleus spp.*	%INF
MEDIUM	3	-	-	-	-	-	
LARGE	7	1	14.3	1	14.3	3	42.8

From table 3, it is evident that all the parasites were isolated from the large size group of infected *Tilapia*. *Caryophylleus spp.* Had the highest rate of occurrence (42.8%).

TABLE 4 : SEX-RELATED INFECTION AMONG THE INFECTED GROUP

HOST	MALES			FEMALES		
	N.E	N.I	%INF	N.E	N.I	%INF
T. nilotica	5	3	60	2	-	-
T. zilli	2	2	100	1	-	-

From table 4, only the males were found to be infected, with *Tilapia zilli* having a 100% rate of infection.

Thomas (1964). The three parasites recorded were *Euclinostomum heterostomum*, *Paracamallanus cyathopharynx* and *Caryophylleus spp* They were all recovered from the intestine of their hosts.

Disease is an enemy the fish farmer must always be watchful for. Diseased fish cause direct and obvious loss through death; but great loss also occurs when disease causes reduced growth, fecundity and stamina, and increases vulnerability of fish to predation (Pitcher & Hart, 1990). Even though several curative methods are available, treatment is difficult and often unpracticable in ponds containing large numbers of fish. Prevention, therefore

is the most effective method of control.

Though pollution is being suspected, it has not been confirmed and as such there is no clear relationship between occurrence of infection/disease among wild fish and pollution of the environment.

Bearing in mind that fish is of high economic importance by not only providing a cheaper source of good quality protein for human consumption but also provides oil for soap making, skin for leather or polishing materials (Moses 1983); (The skin of some cartilagenous fishes makes useful leather and polishing materials); it becomes very important that care should be taken to keep them from being infected in the farms and a way of reducing or keeping them from being infected in the wild looked into.

In a situation where there is economically important incidence of parasites, a pond should be completely evacuated to expose the pond bottom to sunshine before the next stocking. In such cases only fast-growing fish species have to be used in restocking (Awachie et al, 1977). Evacuated ponds can be treated with quick lime. Such treatment will kill molluscs, crustaceans and their eggs as well as the eggs of parasites (Roberts 1978). For reservoirs and large ponds where the evacuation of water is out of the question, the outbreak of parasitic disease can be controlled by the adoption of suitable management procedures. Such procedures will include.

(a) Continous monitoring of the biota to detect the earliest signs of important parasite problems and remedial measures taken.

(b) Control of the fish density- a suitable cropping procedure should be adopted in order to reduce the fish population thereby reducing the chances of rapid spread of diseases.

(c) Adoption of sanitation measures – Growth of vegetation around ponds should be controlled. This will help to keep off such parasites as leaches and snail intermediate hosts of digenean flukes.

(d) Affected fishes can be removed from the ponds to prevent the spread of parasites/diseases (Dogiel et al, 1970).

(e) Each pond must have independent supply of drainage water. Water entering the ponds should exclude the possible entry of wild fish and various developmental stages of parasites through the use of sieves.

It is not yet possible to fully anticipate or to control out breaks of epizootics among fishes in natural waters. It is possible however to reduce appreciably the number of these parasites and thus reduce the harm they cause. For example the protection of spawning groups and efforts to prevent deterioration of their conditions will raise the resistance of fishes and their ability to withstand attacks by various pathogenic parasites (Dogiel et al, 1970). Parasites/diseases in natural waters can also be minimised by not throwing back offals into the waters and avoidance of pollution generally- (Robert, 1978).

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