THE

OF

Tropical Hydrobiology and Fisheries

(Afr. J. Trop. Hydrobiol. Fish.)

Vol. 2 No. 2 1972

East African Literature Bureau
NAIROBI DAR ES SALAAM KAMPALA

SPONSORS
Hydrobiologists from East, Central and West Africa with substantial support from other African countries, Fishery Scientists in the United States, Canada, U.K., Europe, Soviet Union and Israel.

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The Journal will therefore strengthen the African research scientist by making research material available and also increasing the awareness and utility of aquatic resources.
Its quality will conform to International standards, and will be published in English and French.

MANUSCRIPT ADDRESS
Manuscripts should be addressed to E.A.F.F.R.O., East African Freshwater Fisheries, Research Organisation, East African Community, Box 343, Jinja, Uganda.

REPRINTS
Authors will receive 60 reprints free of charge. Extra reprints may be procured on cost.

PUBLISHER
East African Literature Bureau, P.O. Box 30022, Nairobi, Kenya.

ISSUES
The Journal consists of one volume a year, consisting of two issues with approximately eighty pages each.

SUBSCRIPTION
Annual subscription within East Africa Sh. 35. Outside East Africa, East African Sh. 70, US $ 10.00

Notes and Comments

CESTODES IN FISH FROM A POND AT ILE-IFE, NIGERIA

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INTRODUCTION

The Farm Pond, University of Ife, was impounded by the construction of a dam, below the confluence of two small streams, between March and July, 1967. The pond is located at an altitude of 122.4 m. O.D., its outline is an indented trapezium occupying 445 dkm^2 at maximum fill.

Natural food is fed into the pond by its two inlets, and the pond is often coloured a darkish brown due to the abundance of plankton. In 1969, on the recommendation by the Fishery Division, Ministry of Agriculture and Natural Resources, Ibadan, about four standard head-pans of poultry droppings per 40 dkm^2 per month were spread uniformly over the pond during 1969 and 1970. Also four pounds of triple superphosphate per acre per month were spread for a period of six months.

The pond was drained a number of times in 1970. However, the lowest average level of 1.37 m was recorded in April, 1970, before drainage began; and the maximum depth of 5.7 m was recorded in September and October, 1970.

The known original fishes of the streams before impoundment were the African mud fishes: *Clarias lazera* and *Heterobranchus bidorsalis.*

In April, 1970, 694 *Tilapia nilotica* were introduced into the pond: 20 died after stocking and about 674 seem, therefore, to have survived. Catches made during this study included *Hemichromis fasciatus* and it is not impossible that there are other fish species which have not been caught. Since the fish, both original and introduced, are used for food, a search was undertaken for parasites.

MATERIALS AND METHODS

Before a fish was dissected for internal investigations, the external surfaces of the body including scales, fins and skin were examined for ectoparasites or pathological conditions such as ulcers, scars, cysts and injuries resulting from physical and chemical agents.

Scraping of slime from the skin, gills and fins were smeared on a slide and examined fresh. The body cavity was then opened, examined and the result of the investigation of each specimen recorded. Organs examined include: gall bladder, musculature, visceral cavity, squashed eyeballs, eye socket, ali-

mentary canal, gonads, heart, liver, spleen, urinary bladder, kidney and brain. Each organ was carefully examined and kept in a clean petri dish.

Thin blood smears were made, examined fresh and later stained with Leishman's stain for protozoa parasites.

The alimentary canal was removed: oesophagus, stomach, intestine separated and each placed in a separate petri dish. These organs were carefully slit open by a longitudinal incision. When a parasite was found, its site in the organ was noted and then irrigated with 0.65% saline solution.

Stomach contents of the fish were measured and food analysed.

All the parasites recovered were usually allowed to die and stretch out fully in cold water before fixation in Alcohol-Formol-Acetic (A.F.A.) (VAN CLEAVE 1953, cited AWACHIE 1966). Parasites were stained in Borax carmine, dehydrated in alcohol series, cleared in cedar wood oil and mounted in Canada Balsam.

RESULTS

About 55% of the fish examined were found to be infected with endoparasites. No ectoparasites or any external pathological symptoms were found. There were no protozoan parasites in the blood. However, miscellaneous eggs and cysts were found in various organs. The cestode *Polynchobothrium* sp was found to infect *Clarias lazera* while *Anomotaenia* sp was found to infect both *Hemichromis fasciatus* and *Tilapia nilotica*. No parasites were found in *Heterobranchus bidorsalis*. (Table 1.)

Class: Cestoda.

Order: Cyclophyllidae Ben. in Braun, 1900.

Family: Dilopidiae Railliet et Henry, 1909.

Genus: Anomotaenia Cohn, 1900.

Species: *Anomotaenia* sp (Cysticercus)

Description: Small tapeworm cysticercus with double crown of rostellar hooks.

Still inside cysts (Fig. 1A).

Head with scolex evaginated: About 810 μ long and 210 μ at the broadest width. Four suckers each about 50 x 50 μ. Solex 100 μ long and 130 μ at the broadest width. Ten hooks each 40 μ long (Fig. 1B).

Head with scolex invaginated: About 600 μ long and 180 μ at widest part. Hooks intucked in the rostellar sac (Fig. 1C).

Hosts: Hemichromis fasciatus and *Tilapia nilotica.*

Location: Upper intestine of the fish host where they are embedded in the intestinal wall and appear externally as a white grub.

This is the first record of this parasite in Nigeria and the first host record for *Hemichronis fasciatus.*

Order: Pseudophyllidea Carus, 1863.

Family: Ptychobothridae Luhe, 1902.

Genus: *Polyoncobothrium* Diesing, 1854.

Species: *Polyoncobothrium clarias* (Woodland, 1925).

Description: This is a small tapeworm with a bulbous scolex with a circle of 32 hooks arranged in four quandrants of eight hooks each. The apex of the scolex is dome shaped. The scolex measures about 240 μ with a bulbous groove tapering towards the posterior end. The grooved portion stains lighter in Borax carmine. The longest hook measures about 40 μ (Fig. 1D. E).

Host: Clarias lazera.

Location: Intestinal lumen.

Pathogenicity: Nodules were observed in the region where the parasites were recovered.

DISCUSSION

The established norm of 15 dissected specimens for each fish species would give a complete picture of the parasite fauna of all species in a particular sheet of water. Such a dissection reveals not only the "basic

Table 1. Occurrence of Cestodes in Fish Hosts

Fish Host	No. of fish examined	Parasite	Extent of Infection			Infection Intensity		
			Affected organ	No. of affected fish	Fish infection in %	Min. No. of parasites	Max. No. of parasites	Avge. per infected fish
Hemichromis fasciatus	31	*Anomotaenia* sp. (cysticercus)	Upper intestine	15	48.4	1	19	7.8
Tilapia nilotica	8	*Anomotaenia* sp. (cysticercus)	Upper intestine	5	62.5	I	18	4.6
Clarias lazera	7	*Polyonocobothrium clarias*	Intestine	7	100	4	123	25.3
Heterobranchus bidorsalis	5	—	—	—	—	—	—	—

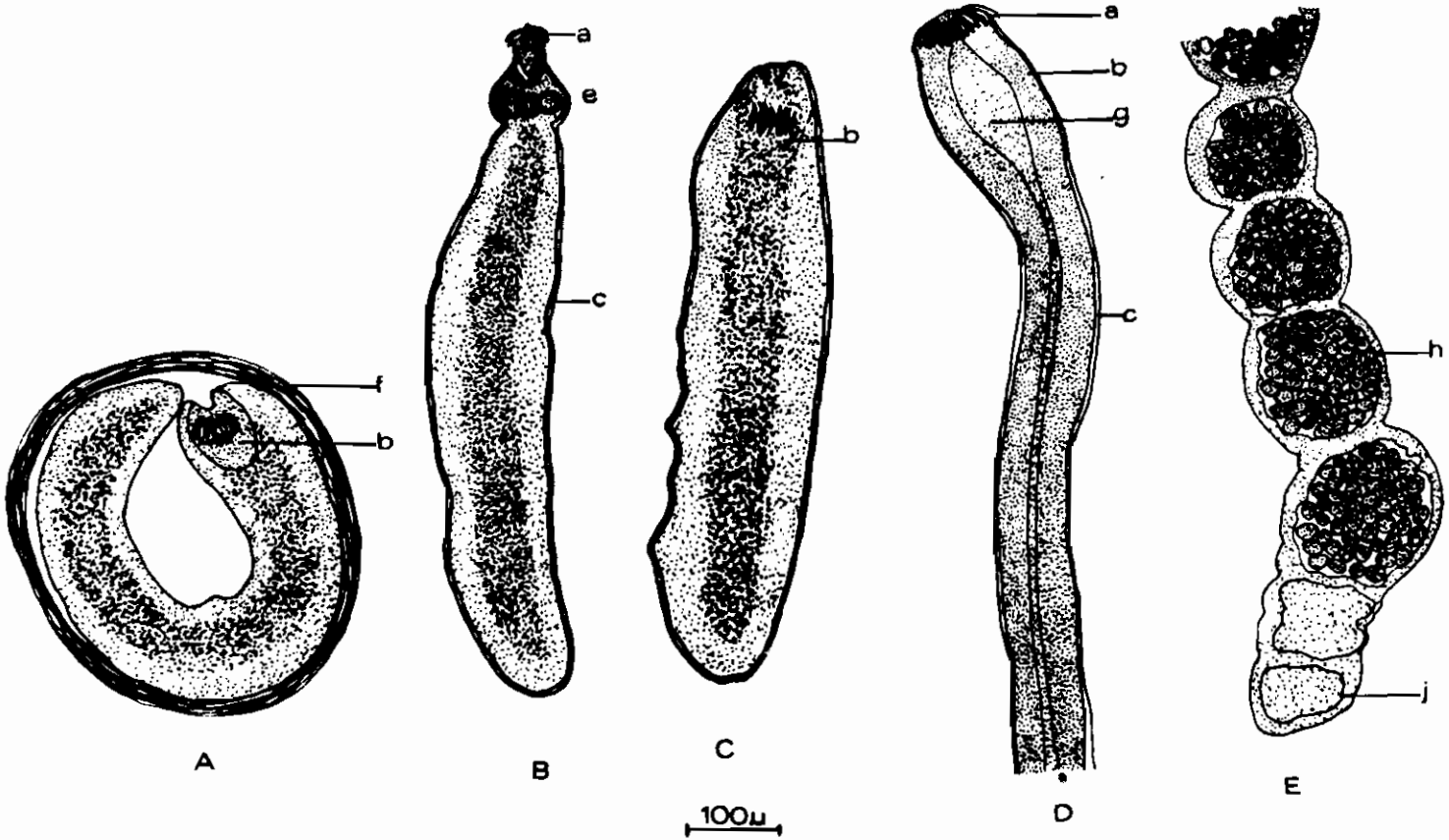

Figure 1A. Anomotaenia sp. (inside cyst).
Figure 1B. Anomotaenia sp. (Cysticercus) with scolex evaginated.
Figure 1C. Anomotaenia sp. (Cysticercus) with scolex invaginated
Figure 1D. Polyonocobothrium Clarias (anterior portion).
Figure 1E. Polyonocobothrium clarias (posterior portion)

a = hooks, b = scolex, c = strobila, d = rostellum, e = sucker, f = cyst wall, g = bothrium, h = gravid proglottis with eggs, i = terminal proglottis with eggs extruded.

contingent" including all species of parasite of which the infection rate is 75% or more, but almost the entire parasite fauna, except for those rare species with an infection rate of less than 10%.

Only the results obtained for *H. fasciatus* fulfill these conditions due to the meagreness of the other fish species available. In spite of this the results from the other fish would seem to merit recording.

It is of interest to observe the similarity in the parasite fauna even though *H. fasciatus* is carnivorous and *T. nilotica* only feeds occasionally on insects in addition to plant life.

Nikolsky notes that all values of condition factor (K) greater than 1 indicate healthy specimens. The average condition factor values of *H. fasciatus* and *T. nilotica*, 1.62 and 1.83 respectively, are therefore indicative of good conditions. There was no significant difference between the condition factor of parasitized and unparasitized *H. fasciatus* ($P=0.7$) *and T. nilotica* ($P=0.7$).

A lessening effect in infection from November to January in *H. fasciatus* and *T. nilotica* was recorded and this indicates a likely monthly variation in the parasite dynamics of the pond. This particular period coincidentally overlaps the time of gradual subsiding of the floods formed during the rains.

The flood brings an abundance of food not earlier accessible to the pond. It would thus appear that the dynamics of the parasites considered reflect seasonal changes in the incidence and intensity of infection. This state of affairs can be correspondingly considered in relation to the mode of life of the intermediate hosts (e.g., some insects being abundant during the rains and gradually becoming scarce as the season gets drier).

The degree of incidence of parasitic infection in *H. fasciatus* increases with age and size. This may be due to the increase in the quantity of food consumed by older fish and the larger size of its prey which can act as intermediate hosts to the parasites.

The apparent higher infection shown by male *H. fasciatus* may be due to their relatively large size. Most of the females were found to be gravid and relatively inactive as normal with spawning fishes, which would hence reduce contact between the fish and its parasites through reduced feeding.

Table 2. Parasites recovered from fish

Host fish	AWACHIE 1965	F.M.A. UKOLI 1965	This study
Hemichromis fasciatus	Nematode 1 sp.	Not investigated	Cestode: Anomotaenia 48.4%
Tilapia nilotica	Trematodes 37% Acanthocephala 4%	Trematodes 40.1% Acanthocephala 15%	Cestode: Anomotaenia 62.5%
Clarias lazera	Aquatic mites 18% infection Cestodes 9% Acarina 9%	Trematodes 7.7% Cestode: Polyonobothrium 30.7% Cestodaria 7.7%	Cestode: Polyonocobothrium 100%
Heterobranchus bidorsalis	None	Nematodes 64.6% Cestode: Polyonocobothrium 88.8% Marsipocephalus 76.4% Cestodaria 7.1%	None

The absence of other parasites reported by other workers (see Table 2) on these same fishes may be due to the present ecological individuality and trophic status of the pond.

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Published by East African Literature Bureau, East African Community Headquarters, Ngong Road, P.O. Box 30022, Nairobi, and printed by English Press, P.O. Box 30127, Accra Road, Nairobi, Kenya.