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Full Length Research Paper

Study on temporal variation of internal fish parasites in Lake Zwai, Ethiopia

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Lake Zwai is located in the rift valley of Ethiopia. Samples of Oreochromis niloticus were collected monthly between July (2010) to June (2011) using gill nets of various mesh sizes. The results indicated that the major internal parasites recorded belong to genus Clinistomum and Contracaecum including Cestodes larval. The prevalence of the parasite differs from season to season. Hence, the infestation was high during the month July to October (2010) for Contracaecum and Clinostomum where as the frequency of Cestodes larva was high in July to August (2010) and in between May and June (2011). On the average, the prevalence was high during July to October (2010) and in June (2011). In conclusion the parasite could bring zoonotic effect on humans even though there is a specific species. Therefore, further studies should be made for identification of these parasite and other common parasites which might cause production loss in the fishery sector.

Key words: Cestodes larva, clinostomum, contracaecum, oreochromis niloticus, lake zwai.

INTRODUCTION

The outbreak of fish disease is mainly related to interaction of the pathogens and environmental stress. Even though different fish species are available in various water bodies in Ethiopia, significant amount of fish are not being harvested from them. One of the factors that hinder fish production is disease. Diseases are known to cause mortality both in aquaculture and inland fisheries and some are also a cause for human diseases in many areas of the world (Roberts, 1989). More than 200 species of fish are known to occur in lakes, rivers and reservoirs in Ethiopia (JERBE, 2007). The country depends on its inland water bodies for fish supply for its population. The annual fish production potential of the country based on empirical methods on individual lake surface area and mean depth of major water bodies was estimated to be 30.000 to 51.000 tons (FAO, 2003). Despite the presence of huge volume of water bodies in the country, its contribution to the national economy is marginal mainly due to manmade and environmental constraints (Amare, 1986). Despite the availability of huge potential for fish production, the country has annual consumption of 240g per person, which is the lowest in Africa. However, 10kg per person per year achieved in areas where there is regular and sufficient supply of fish (MOA, 2002). To improve the productivity of the fishery sector; important constraints remain to be addressed. One of the problems of the fishery sector in the wild population are parasites and disease conditions of fish parasitic diseases reduce fish production by affecting the normal physiology of fish and if left uncontrolled, it can result in mass mortalities or in some cases, can be served as a source of infection for human and other vertebrates that consumed fish (Ayotunde *et al*., 2007). Understanding the etiology of parasitic diseases is of crucial importance as it determines the choice of a potential treatment. Hence, identification of parasites to the genus level is generally sufficient to implement an effective therapeutic or prophylactic strategy (Paperna, 1980). However, the presence of a massive number of parasites on each fish might constitute a real threat to the fish population and should require immediate action (Komar and Wondover, 2007).Since researches are the base to undertake intervention measures many studies have to be implemented in this area for the future. However, there are few reports concerning fish health in Ethiopia (Eshetu, 2003; Shibru and Tadesse, 1997; Tefera, 1990). The intention of making a study on the parasite of fish in the lake, therefore, needs to identify the most common economically important parasite of fish and to assess the prevalence of the parasite in the lake.

METHODOLOGY

Description of the study area

Lake Zwai is located in the most northerly Rift Valley

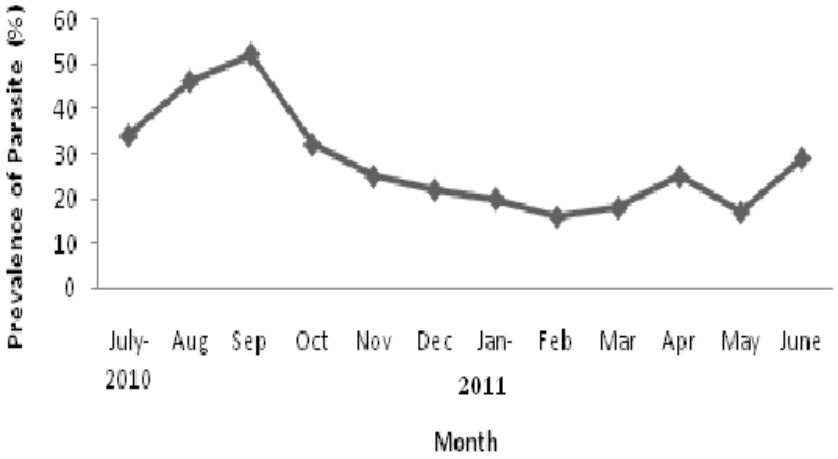

Figure 1. Prevalence of *Contracaecum* parasite in the lake.

Lake which is between 7 51' N to 8 07' N and 38 43' E to 38 57' E, in the Oromia region of the country. Lake Zwai has open water area of 422km^2 and shoreline length of 137 km. The lake is fed by two major rivers, i.e. Ketar and Meki River, and has one outflow in the south, the Bulbula River which flows into Lake Abiyata (LFDP 1993). Five bigger islands are situated in Lake Zeway: Tulu Gudo (4. 8 km2), Tsedecha (2. 1 km^2), Funduro (0.4 km^2), Debre Sina (0.3 km^2) and Galila (0.2 km^2). While the latter two have only a few inhabitants, the three bigger ones are populated with several hundreds of people (Anon, 1999).

Field sampling and measurement

Samples of the specimens were collected monthly from various habitats for twelve months (July 2010 - June 2011) using different mesh size of gill nets and Long lines. The fishing components were set in the afternoon and lifted in the following morning. In addition, fishes caught by fishermen were included to provide a wide range of fish and to increase the data on certain aspects of parasite infestation of the fish. Parasites were sampled or collected opening the coelom by making a ventral surface cut from the anus forward to an imaginary line at the posterior portion of the operculum. Then cut out the entire side of the coelom by cutting a rectangle of skin from behind the operculum, anterior to the anus, and ventral to the backbone. Secondly, following the digestive system from the oesophagus to the anus and list the number of parasite found on different organs. Thirdly, cut out the small and large intestines and use a wash bottle to flush out the inside so that the parasite-like, tapeworms would come out. Finally the samples were put in plastic jars containing 10 % formalin and labeled with all necessary information and transported to Zwai Fishery Resource Research laboratory for further identification of parasites using a stereomicroscope (LEICA MZ 9.5) and an optical microscope (LEICA DMLB 10). For identification of each parasite specimens, the appearance and procedures of Paperna (1980) was used as a guideline.

RESULT AND DISCUSSION

A total of 360 specimens of *O. niloticus* were examined from Lake Zwai. The common parasites were recorded as *Clinostomum, Contacecum* and larval Cestodes. The prevalence of the parasite was found in different rate (Figure.1, 2,3 and 4). The result of this study was far lower than the previous reports of 75.67% (Temesgen, 2003) at Lake Hawassa, 73.24% (Teferra, 1990) at Lake Tana, 48.12% (Shibru and Tadesse, 1997) and 58% (Amare, 1986) at Lake Hawassa. The variation of prevalence rate in the same lake might be the dynamic nature of parasitism and the variation is probably due to geographical difference offering suitable ecological niches for the parasites and/or affecting the susceptibility of the hosts. Since, the definitive hosts of *Clinostomum* species are birds like herons, darters, cormorants and pelicans. Trematodes are established in the mouth and pharynx of these piscivorous birds (Paperna, 1991). It is likely that a large population of piscivorous birds around the lake harbor the adult parasites. *Contracaecum* species that infect freshwater fish are usually found as adults in fish-eating birds, such as cormorants and pelicans. Larval stages are seen in cyprinids (carp and related species), ictalurids (channel catfish), centrarchids (sunfish and bass), tilapia and other cichlids, and percids (perch). On the other hand, the larval stage of the *Contracaecum* species that infected marine fish, such as whiting, capelin, and cod, are typically found as adults in seals (Yanong R. P. E., 2008).Helminth of fish that infested humans cause diseases in humans (Paul Carnes). The result indicated the infections of fishes by

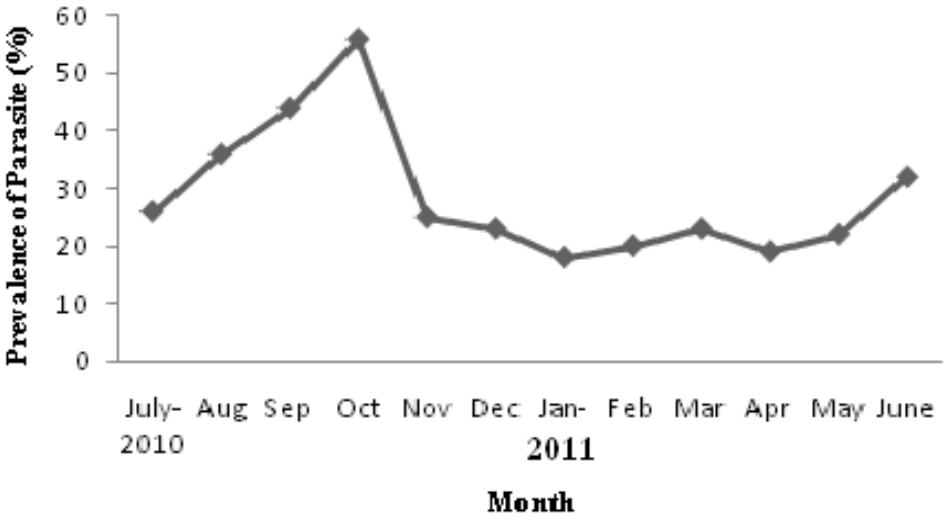

Figure 2. Prevalence of *Clinostomum* parasites in the Lake.

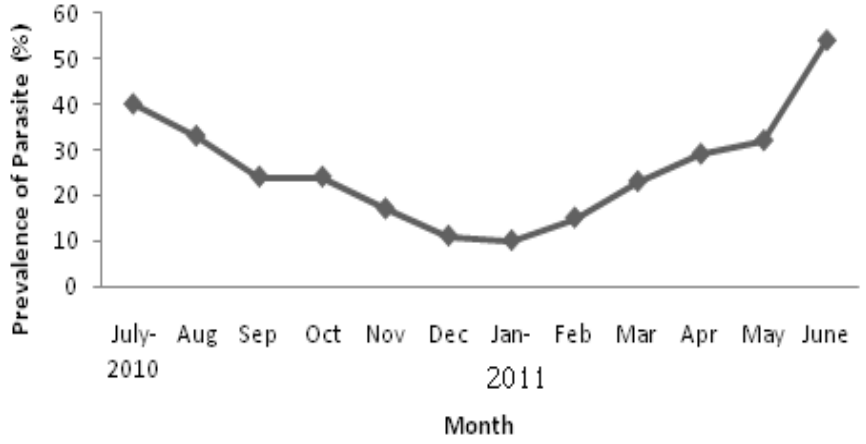

Figure 3. Prevalence of larval Cestodes *O.niloticus* in the lake.

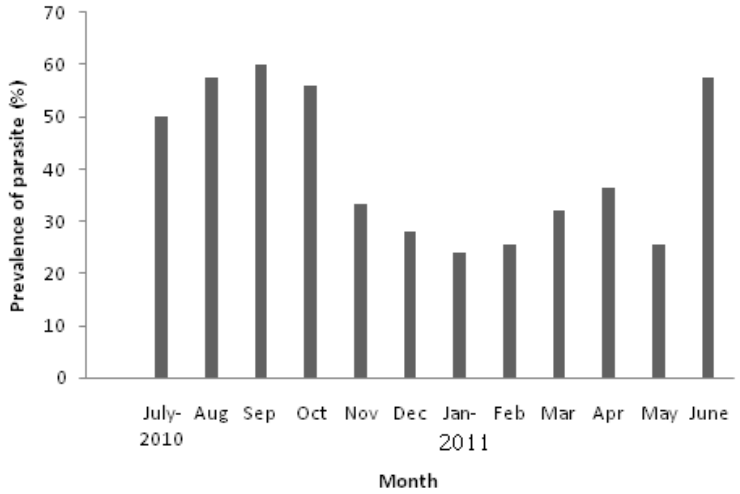

Figure 4. Average prevalence of the three parasite of *O.niloticus* in the lake.

Clinistomum which is considered to be one of the zoonotic fish parasites. Earlier reports from Far East considered *Clinostomum complanatum* as a zoonotic parasite and the cases were recorded from humans that usually consume raw fishes. The existence of *Clinistomum* species in Africa were reported Parpana (1980) who report a peak infestation of Tilapia by *Clinistomum* in Nuguba Dam in South Ghana. Tefera (1990) reported the prevalence of 74.3% in *O. niloticus* in Lake Tana in Ethiopia whereas another report by Eshetu (2003) indicated the prevalence of this parasite decreased to 62.22% in the same species of fishes from the same lake.Paperna (1980) reported that larvae of *Contracaecum* species which were encysted in the mesentery and gut serosa, occurred in East African lakes and in dams in South Africa in predatory fish such as those of the genus of *Clarias*. Teferra (1990) on the other hand reported that, in Lake Tana 68.66% *O. niloticus* were found infected with larval nemathod *Contracaecum* species. This might be due to the maturation of parasites in large number of piscivorous birds around the lake which allow parasites to reproduce more and infect large number of fish hosts. Almost all fish caught were eviscerated along the shore and washed into the lake causing recontamination of the lake that in turn increases parasite burden per fish.

CONCLUSION AND RECOMMENDATIONS

Apart from economic and public health importance, parasites impair fisheries activity. At the lakes, the harvested fish, fishing equipment and fishermen are loaded on the too narrow boat. Therefore, parasites that detach from the fish host bite the bare foot of fishermen causing pain, bleeding and breakage of skin that might allow the entrance of other organisms which may cause anxiety and fear among young fishermen employed in the job. The present study shows that the proportion of parasites differ in prevalence. It may be difficult to draw a definite conclusion that particular parasites is definitely absent from a particular water body. Thus further investigation in all water bodies are urgently needed to determine the effect of parasite infestation and their seasonal dynamics. *Clinostomum* and *Contracaecum* species could therefore represent potential health risks of eating uncooked or slightly cooked fish. Hence, based on the findings of the current study, the following points are recommended: Identification of the genera *Clinostomum, Contracaecum* and Cestodes to the species level is important to check for the occurrence of zoonotic parasites, Consumers should not eat uncooked or slightly cooked fish and health education should be given for them on the risk of eating raw and partly cooked fish, Proper waste and offal disposal method should be implemented to avoid the existing contamination of the lake and to break the life cycle of parasites of fish and an effective parasite control program should be incorporated in the management of the lake.

REFERENCE

Anon (1999). Regional Government of Oromia, Oromia Economic Study Project Office, Agricultural Sector Study draft final report. Addis Ababa.

Amare T (1986). Parasites of fish from Lake Awasa and Chamo, DVM. Thesis, Faculty of Veterinary Medicine, Addis Ababa University, Debre Zeit, Ethiopia. Pp. 13-15.

Ayotunde EO, Change ST, Okey IR (2007). Parasitological examination and food composition in the gut of Feral African carp, lebeo coubie in the Cross River, south Eastern, Nigeria. Afr. *J. Biotechnol. (6*)**.** Pp. 625-630*.*

Eshetu Y (2003). Preliminary Survey of parasites and pathogens of fish at Lake Zeway. *Ethiopian. J. Sci*. (23). pp. 22-25.

FAO (2003). FAO Fishery country profile, Ethiopia. http:// www.Fao.org/fi/oldsite/FCP/en/ETH/profile.htm.

JERBE (2007).Fish diversity in the main drainage systems of Ethiopia. Addis Ababa, Ethiopia. Unpublished manuscript

Komar C, Wondover N (2007). Parasitic disease of *Tellapia.* http: // aqua. Internet.com.

LFDP (1993). Fisheries Baseline Survey, Lake Ziway Lake Fisheries Development Working Paper no 7.Addis Ababa, Ministry of Agriculture.

MOA (2002). Ministry of Agriculture, Animals and Fisheries Department, Addis Ababa, Ethiopia. Pp. 23-28.

Paperna I (1980). Parasites infections and diseases of fish in Africa. CLFA. Tech. Paper. (7**).** Pp. 216-250.

Paperna I (1991). Disease caused by parasites in the aquaculture of warm water fish, Ann. Riv. Fish Dis. (1). pp. 155-194.

Roberts LS, Janovy J (2000). Jerald D. Schmidt and Larry S. Roberts' Faundations of Parasitology, 6th edition. McGraw-Hill Interational Editions, Boston. Pp. 156-187.

Shibru T, Tadesse GE (1997). Observation on parasites of *Tilapia nilotica* and *Claries mossambicus*, at Lake Awasa, Ethiopia*. J. Agr. Sci. (*2). Pp.126-130.

Teferra W (1990). Parasites of fish from Lake Tana. DVM. Thesis, Addis Ababa University Faculty of Veterinary Medicine, Debre Zeit, Ethiiopia. P. 14.

Temesgen Z (2003). Study on parasite of fish at Lake Awassa. DVM thesis, Addis Ababa University, Faculty of Veterinary Medicine, Debre Zeit, Ethiopia. P.12.

Yanong RPE (2008). Nematode (round worm), infection in fish (Online onedis.ifas.ufl.edu Tuesday13th, Jan, 2009).