Prevalence of Gastro-Intestinal Helminths of tilapia fish (Oreochromis niloticus) in Damaturu metropolis.

[1]Alhaji Goni Kyari, [2]Abba Haruna Adamu, [3]Abdullahi Yusuf Abubakar and [4]Muhammad Bukar Abdullahi

[1, 2 & 3] Department of Science Laboratory Technology,
[4] Department of Agricultural Technology,
School of Science and Technology,
The Federal Polytechnic, P.M.B 1006, Damaturu, Yobe State, Nigeria

[*]**Corresponding Author's email: aha@fedpodam.edu.ng +2347061069638**

Abstract

This research was conducted in Damaturu metropolis. A total of 60 Tilapia fish were observed for helmiths parasites in Damaturu Metropolis between the months of October and November, 2022. Samples were collected and processed, where the gastro-intestinal tract was dissected and 1-2 drops of Potassium Hydroxide was added to fix them in an extended state. A portion of the sediment was placed on a plain slide covered with cover slip and was mounted on a microscope and observed using at x10 and x40 objective lens. Out of these 16 (26.67%) were positive for gastro-intestinal helminths. The breakdown for the gastro-intestinal for the two months are as follows: October having the highest infection of tapeworm (Cestodes) with 13(43.33%), Trematodes 7(23.22%) and Nematodes 5(16.67%), and in November having the highest infection rate of Cestodes and Nematodes with 9(30%) and Trematodes with 3(10%). The reasons for the variation in infection rate over the months was probably attributed to heavy rainfall which correspond with high infection rate with the parasites, which may be as a result of rainfall favouring the development of the parasites.

Key words: Tilapia, Helminths, Gastro-intestinal, Infection, Parasite

I. Introduction

Tilapia is the common name, there are more than hundred species of Cichlid fish from the Tilapiine tribe. They are mainly freshwater fish inhabiting shallow streams, ponds, rivers and lakes, and less commonly in brackish water (De Silva *et al*., 2012). Tilapia feeds on algae, or any plant based food, exposing them to sources of infection by fish parasites (De Silva *et al*., 2012).

The increase in human population and reports of large numbers of undernourished or starving people, especially in developing countries, has made the need for food production a major worldwide concern (Okechi, 2014). Fish plays a significant role in the economic development of any fish producing country. It is considered a cheap source of high quality nutritive animal protein (Adekoya and Miller, 2008). As the world population grows, fish resources are being depleted at an alarming rate as a result of over harvesting, and pollution, thus fish production is struggling to meet the increasing demand of the growing population.

Poor environmental conditions and pollution often result in reduced immunity of fish and increased susceptibility to parasitic infestation and disease (Murray, 2015).

Fish has a nutrient profile superior to all terrestrial meats and equally has a high digestible energy that can meet the nutritional requirements of rural population (Amiengheme, 2016). Fish is rich in iron, zinc, magnesium, phosphorous, calcium, vitamin A and vitamin C, and marine fish is a good source of iodine. Fish also contain fatty acids which are essential for the development of the human brain and body, and are particularly crucial for the diets of babies, children, and pregnant and lactating women (World Fish Center, 2010).

In some developing countries including Nigeria, fish culture is regarded as a source of petty cash and means for poverty alleviation to rural household that engaged in fishing, fish processing, retailing fish and fish products as occupation and business (Gomna, 2005; 2011). Improvement in fish culture and production will go a long away to curb hunger, create jobs to youths and serve as reliable food security (Okechi, 2014; Gabriel *et al*., 2017; Adewuyi *et al*., 2013). Tilapias are produced most economically in tropical and sub-tropical countries which have favourable temperatures for their growth (Mensah *et al*., 2013; Adams *et al*., 2014).

There are over 25 species of tilapias in Nigeria, out of which about six species are used for aquaculture, namely, *Tilapia zilli, T. guineensis* (substrate spawners, macro-phytophagous (generally herbivorous)), *Sarotherodon galilaeus, S. melanotheron* (bi-parental mouth-brooders, micro-phytophagous (planktophagous)), *Oreochromis niloticus* and *O. aureus* (maternal mouth-brooders, omnivorous) (Idodo, 2013; Adesulu and Sydenham, 2016). They are widely cultivated in ponds, reservoirs and cages in Nigeria (Fagbenro, 2014) and are suited to low-technology farming systems because of their fast growth rate, efficient use of natural aquatic foods, propensity to consume a variety of supplementary feeds, omnivorous food habits, resistance to disease and handling, ease of reproduction in captivity, and tolerance to wide ranges of environmental conditions (Idodo, 2013; Adesulu and Sydenham, 2016). The feeding habit of this class of fish exposes them to sources of infection by fish parasites (Biu and Nkechi, 2013). The aim of this research was to determine the prevalence of gastro-intestinal helminths of Tilapia species.

II. Methodology

Study area

The research was conducted at Damaturu main market along Potiskum road, Yobe state.

Sample collection

A total of 60 Tilapia fish were purchased from Damaturu main market at the rate of 10 samples per week, and brought to the laboratory of Department of Science Laboratory Technology, the Federal Polytechnic Damaturu for further analysis.

Parasitological examination

Parasitological Examination of the samples were carried out using a method described by (Goselle et al., 2008) with slight modifications.

The gastro-intestinal tract was dissected, where 1-2 drops of Potassium Hydroxide was added to fix them in an extended state. A portion of the sediment was placed on a plain slide covered with cover slip, mounted on a microscope and observed using at x10 and x40 objective lens.

Result

Table 1: Prevalence of gastro-intestinal helminths of Tilapia fish (Oreochromis niloticus), observed in the month of October, 2022.

Sample Date	No. of fish Observed	No. of Infected fish	No. of Uninfected fish	Percentage infection rate (%)
08/10/2022	10	3	7	10
15/10/2022	10	4	6	13.33
22/10/2022	10	2	8	6.67
Total	30	9	21	43.33

Table 2: Prevalence of gastro-intestinal helminths of Tilapia fish (Oreochromis niloticus), observed in the month of November, 2022.

Sample Date	No. of fish Observed	No. of Infected fish	No. of Uninfected fish	Percentage of infection rate (%)
11/11/2022	10	1	9	3.33
18/11/2022	10	0	10	0
25/11/2022	10	2	8	6.67
Total	30	3	27	10

Table 3: Species of helminthes observed in Tilapia fish (Oreochromis niloticus) for the month of October and November, 2022.

Helminths Species	October	Percentage (%) Infection Rate	November	Percentage (%) Infection Rate
Cestodes	13	52	9	43
Trematodes	7	28	3	14.3
Nematodes	5	20	9	43
Total	25		21	

III. Discussion

The highest gastro-intestinal helminths cases were recorded in the month of October while in the month of November experienced the least. This is due to higher rainfall in October. This agreed with the findings of Gabriel et al., (2017) which stated that heavy rainfall contribute to helminthes parasite infestations. The highest case of Cestodes were recorded in October with 13(43.33%) infected due to the level of high rainfall which makes the condition favorable. The least Cestode infection was recorded in the month of November with 9(30%) respectively. The highest case of Trematodes were recorded in the month of October with 7(23.33%) when compared with the month of November. This is due to the level of high rainfall which make the condition favourable for the growth of the intermediate host, (Bradybaena species). The month of November recorded the least number of Trematode species with 3(10%), but in November the number of Nematodes species recorded were higher than in October with 5(16.67%). Murray, (2015) reported that helminthes intermediate hosts are found abundantly in ponds and streams, thereby increasing the population of the intermediate hosts (Ephemera strigata).

IV. Conclusion

Despite the economic contribution of these fish in terms of protein production. Gastro-intestinal helminths parasites still remains one of the devastating disease causing mortality and hindering growth of Tilapia.

This research revealed that prevalence of helminths parasite in Tilapia fish is moderate and has an effect on Tilapia fish maximum productivity in the study area. It is important to know that gastro-intestinal helminth infection in tilapia fish could alter their normal growth and hinders adequate weight gain. It is necessary to control all possible measures of tilapia fish infection with helminths parasite for healthy production and consumption in the study area.

V. Recommendations

Tilapia fish management plays an important role in the occurrence of gastro-intestinal helminthes. The research recommends that, Proper management and feedings should be adhered to than semi-intensive management system, as Tilapia fish are more prone to gastro-intestinal helminthes in the semi-intensive management system. This research shows that, the case for the incidence of infection are lack of effective preventive measure, like the use of effective anti-helminthic drugs against the worms. Hence, proper observation by culturists should be maintained regularly so as to avoid taking contaminated or half-cooked fish to prevent infection by gastro-intestinal helminthes parasites.

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