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Incidence of Parasites in Some Fresh Water Fish Species Inoyo Town Oyo State, Nigeria: A Threat to National Food Security.

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ABSTRACT
Incidence of parasites in fresh water fish in Oyo was investigated in 2014. a total of 617 freshwater fishes comprising of 181 (29.3%) 211(34.2%) and 225 (36.5%) of Tilapa zilli, Clarias anguillaris and Clarias gariepinus respectively were purchased alive from fresh fish sellers in Erelu water reservoir, Asipa river and some cultured ponds in Oyo town, these were examined for helminth parasite. Out of these 386(62%, C.I=.58-0.68) were infected. Cuculanus species (a nematode) accounted for the highest prevalence 249 (40.4%, C.I=0.35-0.45) in the fish species examined. There were significant differences in the occurrence of Monobothrium (F=1,29;P<0.05P. Clariae (F=3.92;P<0.05) and N.rutili (F=1.07;P<0.05) in the Gastrointestinal tract of fish species examined. The prevalence of infection in the fish species examined increases with their standard length and body weight. The prevalence of infection in male and female fish species except in C.anguillaris was statistically significant (P>0.05). The fish species examined could have suffered malnutrition due to parasitic infections. This condition may result to devaluation in protein content in the body of the fish which may be a threat to the national food security. Invariably, protein deficiency impairs normal metabolism of the liver particularly in man. Therefore the infected fish can transmit diseases to man,resulting to poor public health. This study is of the opinion that, proper study into the life cycle of these parasites, will help in the control measures that can enhance good quality and quantity of fish in Oyo town and in Nigeria as an entity.

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I. Background to the Study

By virtue of fish economic importance to man, especially with the rapidly increasing human population and consequent increasing protein demand, information on the parasites of fish becomes particularly important as these parasites may affect fish production and quality. Just like every other animals, fish are subjected to parasites, diseases and predations that reduce their reproduction, growth, appearance and welfare (Hine, 1993). Although studies on the biology, nutrition growth and management of *Tilapia zilli*, *Clarias anguillaris* and*Clarias gariepinus*, have been carried out (Eyo and Olatunde, 2001; Ovie, 2002; Fagbuaro et. al,2004 and Olofintoye, 2006).

According to Ukoli, 1990 as reported by Olofintoye, 2006, allergic responses to toxic waste products of the parasites may be evident by the consumer of the infected fish.

Fish diseases may be parasitic, microbial, viral, environmental (Paperna, 1996)or predatory in origin (Ugwuzor, 1987),but the pathological conditions arising from parasitic infections potentiate serious consequences especially under crowded condition (Van.Dan Brocks, 1999). Fish is infected by protozan and heliminth parasites the mortalities of fish caused by the protozoans(*Ichthyophthiriusmutifighis)* hadbeen reported in Malaysia, Indonesia (Fouquet, 1996) and the Philipines (Davy and Chouinbord, 1983). However, myriad of parasites are associated with *Tilapia zilli*,*Clarias anguillarris* and *Clariasgariepinus* in their natural habitats, where they cause mobility, mortality and economic losses in fish production in the world (Khalil and Thurstom, 1973;Subashinghe, 1995).

Therefore this study is aimed at carrying out parasite screening for the three common freshwater fish species-*Clariasanguillaris*, *Clariasgariepinus* and *Tilapiazilli*in Oyo town.

II. Materials and Methods

A total of 617 freshwater fishes comprising of 181 (29.3%), 211 (34.2%) and 225 (36.5%) of *Tilapiazilli*, *Clariasanguillaris* and *Clariasgariepinus* respectively were purchased alive from fishermen and fresh fish sellers in Erelu water reservoir, Asipa river and various cultured fish ponds in Oyo Town in 2014. The fish specimens were transported to the laboratory for weight (g) and standard length (cm) measurements and sexes were also determined.

The parasites recovered from fish stomach, intestine, rectum and gill slits were fixed in hot 4% formaldehyde and cleared with glycerine for examination. After examination, the specimens were stored in vials with 70% ethanol. The parasites were identified using the methods Yamaguti (1959 and 1961), Cheng (1973) and Paperna (1996). Analysis of variance (ANOVA) statistics and students t-test were used to determine the prevalence of parasitic infection and the level of significance . Significance was taken at $p>0.05$.

III. Result

Table 1 shows the prevalence of intestinal Helminth parasites in examined fish species.

Out of the 617 fresh fish examined, 386 (62.6%, C.I= 0.58-0.68) were infected with helminth parasites. Cuculanus sp accounted for the highest prevalence 249 (40.4%, C.I. =0. 35-0.45) in the fish species examined and Neochinorhynchus rutili had the least prevalence 7 (1.1%,C.I. = 0.001-0.02). The high prevalence of *Cuculanus*sp among other helminth species in *T. zilli* 33(18.2%), C.I=0.1-026), *C.anguillaris* 110 (52.1%), C.I= 0.44-0.60) and *C.gariepinus* 106 (47.1%, C.I= 0.39-0.55) could suggest adaptive behaviour of nematode in relation to host specificity.

The overall prevalence of 62.6% of helminth parasites observed in this study compared well with the observation of Olofintoye, (2006) Fagbuaro et.al (2004) Ugwuzor (1987) and Onwuliri and Mgbemena (1987) but higher than the observation of 34.6% prevalence of infection by Anosike et al. (1992). This suggests that the occurrence of parasitism varied from one habitat to the other which could be due to host- parasite relationship and abiotic factors (Anderson, 1992).

Table 2 shows that there were significant differences in the occurrence of Monobothrium ($F= 1.29$; $p<0.05$), *P Clariae* ($F=3.92$; $P<0.05$) and *N. rutili*($F=1.07$; $P<0.05$) in the gastrointestestinal tract of fish species examined. However, the occurrence of *P. leavionchus* and *Cuculanus*were not significant ($F=29.72$ and $F=26.54$ at $P<0.05$) respectively. The affinity of nematode parasites (*P. laevionchs* and *Culūlanus*) and Cestodes (*Monobothrium* and *P. Clariae* to the intestinal region) Could result to mechanical pressure which may set up inflammation, cause the formation of connective tissue and rupture of host tissue. In other words the nutritive value of fish may be degraded through the activities of these parasites. (Noble and Noble, 1971 and Williams and Jones, 1994).

Table 3 reveals that the prevalence of intestinal helminth infection in fish species examined increases with their standard length from 0.0% prevalence of infection of 10.0-19.9 cm in standard length. Similarly Table 4 show that the prevalence of infection increases with the body weight of the fish species examined 0. 0% prevalence infection of 70-119 body weight to 87.5% prevalence infection of 570-619 0f body weight. The probable reason for differences in prevalence of infection between the juvenile and the adult fish as related to their standard length and body weigh may be due to change in diet from weeds seeds Phytoplanktons and Zooplanktons to insect larvae, snails, crustaceans, worms and fish in both juveniles and adulthood respectively (Read et al., 1967).

Table 5 shows that the prevalence of infection in male and female of all the fish species examined except C. anguillaris was statistically significant $P>0.05$.

IV. CONCLUSION

Conclusively, the fish species examined could have suffered malnutrition due to parasitic infections. This condition may result to devaluation in protein content in the body of the fishwhich may be a threat to the national food security. Invariably, protein deficiency impairs normal metabolism of the liver particularly in man. Therefore the infected fish can transmit diseases to man, resulting in poor public health(Nwuba et al., 1999). By 2050 to feed the estimated human population of around 9 billion, there is requirement of 50% increase in the food production (Singh et al., 2014), which can only be fulfilled by clean, healthy and sustainable food animal production. Livestock industry is facing considerable economic losses due to infectious diseases. So an effective control strategy is needed of today to control these infectious diseases and contribute in augmentation of livestock production.This study is of the opinion that, proper study into the life cycle of these parasites, will also help in the control measures that can enhance good quality and quantity of fish as a source of an affordable animal protein in Oyo town and in Nigeria as an entity.

Table 1: prevalence of intestinal Helminth Parasites in fish species examined

Parasite	Taxonomic Group	*Tilapia Zilli* n=181 no (%) of Fish infected	C.I$	Clarias anguillaris N=211 No (%) of fish infected	C.I$	Clarias gariepinus N=225 No (%) of fish infected	C.I	Total no of fish N=617 No (%) of fish infected	C.I$
Laevionhus	Nematoda	26 (14.4)	0.06-0.22	22(10.4)	0.05-0.15	32(14.2)	0.09-0.19	80(12.9)	0.10-0.16
Cuculanus sp	Nematode	33 (18.2)	0.1-0.26	110(52.1)	0.44-0.60	106(47.1)	0.39-0.55	24(40.4)	0.35-0.45
Monobothrium sp	Cestoda	3 (1.7)	-0.01-0.05	9(4.3)	0.01-0.07	7(3.1)	0.0-0.06	19(3.1)	0.01-0.05
Polyonchobothrium Clariae	Cestoda	17 (9.4)	0.03-0.15	2(0.9)	0.85-0.95	12(5.3)	0.02-0.08	31(5.1)	0.03-0.07
Neochinorhychus ritili	Acanthocephala	3 (1.7)	-0.01-0.05	0(0.0)	0.0-0.0	4(1.8)	0.0-0.04	7(1.1)	0.01-0.02
Total		82 (45.3)	0.34-0.56	143(67.8)	0.60-0.76	161(71.6)	0.65-0.79	386(62.6)	0.58-0.68

C.I* 95% confidence interval

Table2: The occurrence of *Monobothrium, P.clariae*and *N. rutili* in the gastrointestinal tract of fish species examined

Fish Species	*Procamellanuslaevionchus* S	I	R	G	*Cucullanus* Species S	I	R	G	*Monobothrium* Species S	I	R	G	*Polyonchobothriumclariae* S	I	R	G	Neochinorhynchus rutili S	I	R	G
T.zilli	0	71	0	0	7	94	0	0	21	10	0	0	20	23	0	0	20	8	0	1
C.anguillars	2	90	0	9	47	108	0	5	4	20	0	5	4	20	0	5	2	1	0	2
C.gariepinus	9	48	0	11	46	86	0	0	10	7	0	0	5	17	0	0	3	5	0	4
Total	11	209	0	20	100	288	0	5	35	37	0	0	29	60	0	5	25	14	0	7

S= Stomach. I=Intestinals. R=Rectum. G= Gill Slits. The occurrence of *monobothrium, P. clariae* and *N. rutili* were significant (F=1.29; F=3.92 and F=1.07 at P<0.05> respectively and the occurrence of *P. laevionchus* and *Cuculanus* were not significant) (F=29.72 and F=26.54 at P<0.05) respectively.

Table 3: Prevalence (%) of intestinal Helminth infection in fish species collected in relation to their standard length

Standard Length (cm)	*T.zilli* n=18 No(%) of fish Examined	No(%)fish infected	Total no (%) of parasite recovered	*C.angullaris* n=211 No(%)fish Examined	No(%) of fish infected	Total no % of parasite recovered	*C.gariepinus* n=225 No (%)of fish Examined	No (%) fish infected	Total no (%) of parasite recovered
10-19. 9	8(4.4)	(0.0)	(0.0)	4 (1.9)	(0.0)	(0.0)	8 (3.6)	(0.0)	(0.0)
20-29. 9	34 (18.8)	2 (5.9)	10.(3.6)	11 (5.2)	(0.0)	(0.0)	14 (6.2)	(0.0)	(0.0)
30-39. 9	101(55.8)	54 (53.5)	152(55.3)	51 (24.2)	32 (62.7)	41 (14.4)	50 (2.2)	31 (62.0)	67 (24.7)
40-49. 9	25 (13.8)	17(68.0)	77 (28.0)	95 (45.0)	71 (74.7)	161 (56.7)	108 (48.0)	92 (85.2)	148 (54.6)
50-59. 9	13(7.2)	9(69.2)	36 (13.1)	50 (23.7)	40 (80.0)	82 (28.9)	45 (20.0)	39 (86.7)	56 (20.7)
Total	181(100.0)	82(45.3)	275 (100.0)	211 (100.0)	143 (67.8)	284 (100.0)	225 (100.0)	162 (72.0)	271 (100.0)

Table 4: prevalence of intestinal Helminth infection in fish species collected in relation to body weight

Body weight(g)	*T. zilli* n=181 No(%) of fish Examined	No(%)of fish infected	Total no(%)of parasite recovered	*C. anguillaris* n =211 No(%)of fish Examined	No(%)of fish infected	Total no (%)of parasite recovered	*C. gariepinus* n=225 No(%) of fish Examined	No(%)of fish infected	Total no(%)of parasite recovered
70-119	5 (2.8)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
120-169	23 (12.7)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
170-219	82 (45.3)	36 (43.9)	61 (22. 2)	1 (0.5)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
220=269	39 (21.5)	21 (53.8)	122 (44.4)	5(2.5)	0 (0)	0 (0)	4 (1.7)	0 (0)	0 (0)
270-319	21 (11. 6)	16 (76.2)	56 (20.4)	3 (1.4)	0 (0)	0 (0)	6 (2.60)	0 (0)	0 (0)
320-369	11 (6. 1)	9 (81.8)	36 (13. 1)	25 (11. 8)	13 (52. 0)	24 (8.5)	36 (16. 0)	23 (63 .9)	46 (17. 0)
370-419	0 (0)	0 (0)	0 (0)	52 (24. 6)	36 (69. 2)	64 (22. 5)	26 (11.6)	21 (80.8)	39 (14. 4)
420-469	0 (0)	0 (0)	0 (0)	31 (14. 7)	25 (80.6)	43 (15. 1)	92 (40. 9)	57 (61. 9)	70 (25. 8)
470-519	0 (0)	0 (0)	0 (0)	72 (34. 1)	52 (72. 2)	82 (28. 9)	42 (18.7)	34 (80. 9)	71 (26. 2)
520-569	0 (0)	0 (0)	0 (0)	17 (8.1)	13 (76. 5)	41 (14. 4)	11 (4.9)	9 (81. 8)	26 (9. 6)
570-619	0 (0)	0 (0)	0 (0)	5 (2.4)	4 (80.0)	30 (10 . 6)	8 (3.6)	7 (87. 5)	19 (7. 0)
total	181 (100.0)	82 (45.3)	275(100. 0)	211 (100. 0)	143 (67.8)	284 (100.0)	225 (100.0)	151 (67.1)	271 (100.0)

Table 5: Prevalence of Gastrointestinal Helminth of the fish species examined in relation to sex

Fish species	Sex	No (%) of fish Examined	C.I*	No (5)of fish infected	C.I*	Total no (%) parasites recovered	C.I*
T. zilli	Male	121 (66. 9)	0.60-0.74	61 (50. 4)	0.39-0.61	181 (65. 8)	0.60-0.72
	Female	60 (33.1)	0.01-0.05	21 (35. 0)	0.25-0.45	94 (34. 20)	0.28-0.40
	Total	181 (100.0)	0.00-0.00	82 (45. 3)	0.35-0.56	275(100. 0)	0.0-0.0
C. anguillaris	Male	140 (66.4)	0.60-0.72	94 (67.1)	0.59-0.75	201(70. 8)	0.66-0.76
	Female	71 (33. 6)	0.28-0.40	49 (69. 0)	0.61-0.77	83 (29. 2)	0.25-0.35
	Total	211 (100.0)	0.00-0.00	143 (67.8)	0.60-076	284(100.0)	0.0-0.0
C. gariepinus	Male	159 (70. 7)	0.65-0.77	121 (76. 1)	0.69-0.83	191(70. 5)	0.25-0.35
	Female	66 (29. 3)	0.23-0.35	40 (60. 6)	0.53-0.69	80(29. 5)	0.65-0.75
	Total	225 (100.0)	0.0-0.0	161 (71. 6)	0.65-0. 79	271(100.0)	0.0-0.0

C.I*= 95% confidence interval.

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