Jour. Myan. Acad. Arts & Sc. 2007 Vol. V. No. 4

Reinvestigation on *Glossogobius Giuris* (Hamilton, 1822) Found in Mandalay and Sagaing Environs

Cho Cho Win

Abstract

Specimens of *Glossogobius giuris* have been taken during August 2004 to January 2006. These specimens were collected from Taungthaman Lake and ponds in Sagaing. In this research, only *Glossogobius giuris* specimens were measured and counted for fin formula. Investigation has been found out whether there has been parasites on *Glossogobius giuris*. Detailed classification and descriptions of the species were given. Ecological data were recorded. Statistical analyses using Wilcoxon Singed Ranks Test and Chi-square Test were used.

Chi-square Test has been employed to examine and find out whether there has been any ratio between the standard length and snout length.

Wilcoxon Singed Ranks Test has been used for comparison of the lengths of the specimens collected from Taungthaman Lake and ponds in Sagaing.

Introduction

Fish constitutes almost half the total number of vertebrates and forms a great significance in the life of mankind, being a most important source of proteins and providing other useful products (Nikolsky,1999). Fish proteins nowadays are also used in medicine. This group of vertebrates occupy a peculiar in the hierarchy of animal life and economically constitute a very important group of animals. There are about 30,000 to 40,000 species of fishes differing widely from each other in shape, size, habits and habitat (Jordan,2000).

Glossogobius giuris is cosmopolitan in nature and also widely distributed both in Upper and Lower Myanmar. It could exist in freshwater, brackish and coastal water. It could grow more larger in brackish water than in freshwater (Munro,1955). There is only a single species *Glossogobius giuris*, Ka-tha-poe in Myanmar. The writer intrested in studying ecological data and fin formula of only *Glossogobius giuris* from Taungthaman Lake and ponds in Sagaing.

Hamilton (1822) recorded only one species belonging to this genus *Glossogobius* from Myanmar waters. Day (1878) described the taxonomic

Associate Professor, Department of Zoology, University of Distance Education, Mandalay

descriptions and habitats of the freshwater *Gobius giuris*, Nga-tha-boh. Nelson (1994) stated that *Glossogobius giuris* is very common in freshwaters on oceanic islands.

Most seasonal lakes of Upper Myanmar including Taungthaman Lake and ponds in Sagaing are flood fisheries formed by the Ayeyawaddy River. They are an important source of revenue to the country and a means of livelihood to the population of the surrounding areas. Water pollution from biological water is a very serious problem and this is affecting biodiversity. Investigation has been found out whether there have been polluted in Taungthaman Lake and ponds in Sagaing.

Mukherjee and Haldar (1980) observed *Eimeria glossogobii,* coccidian parasite in the intestine of *Glossogobius giuris*. The adult specimen of the *Glossogobius* which belongs to the family Gobiidae was caught in Sungai Endau. May Kyi Tun (1983) studied the internal parasites of some fishes of Taungthaman Lake. No parasites for *Glossogobius giuris* were recorded in the study of May Kyi Tun (1983).Confirmation has been carried out whether there have been parasites on *Glossogobius giuris* or not.

The present work is undertaken in view of adding some more data on the prevailing record on *Glossogobius giuris* that inhabit in Taungthama Lake and ponds in Sagaing. This research is based on the findings of other scholars, attempt has been made for new findings concerning *Glossogobius giuris*. It is hoped that the new findings will be of help to others for further investigation on *Glossogobius giuris*.

Materials and Methods

Study sites

In this work, the specimens were collected from Taungthaman Lake and ponds in Sagaing. Taungthaman Lake lies in Amarapura Township in Mandalay Division. It is about 3 miles from North to South, 1 miles from East to West and 12 to 14 feets in depth. It is a seasonal lake and fed by Ayeyawaddy River during the rainy season. Another study sites are the ponds in Myoma Township, Sagaing. In rainy season, the river water from Ayeyawaddy River flows into the ponds. At that time water level rises up and water surface area is widened.

Collection of the specimens

The collection of the specimens was made from August 2004 to January 2006. A total of (500) bar-eyed goby were collected from Taungthaman Lake and ponds in Sagaing. Both males and females were utilized in this work. Soon after the collection, vernacular names and colouration were recorded in fresh forms. And then they were preserved in ten percent formalin. Fin formula was recorded. The specimens were then measured for the total length (measured from the tip of the snout to the tip of the caudal fin), standard length (measured from the tip of the snout to the base of the caudal fin) and snout length (measured from the tip of the snout to the anterior margin of the eyes).

Sexing of the specimens

The genital papillae of males from both Taungthaman Lake and Sagaing are conical in shape while in female they are round.

Examination of the parasites

The collected specimens were examined for parasites both externally and internally.

Collection of the ecological data

Ecological data such as temperatures (air and water temperatures), pH, chemical oxygen demand (COD), dissolved oxygen (DO), and biological oxygen demand (BOD) were recorded from the study sites.

Fishing gears

The specimens were caught with trawls, set-nets and traps.

Statistical analysis

Based on the data, the statistical analyses using Wilcoxon Singed Ranks Test and Chi- square Test were used. We do need to use Wilcoxon Singed Ranks Test to confirm the minute differences between specimens from Taungthaman Lake and Sagaing.

Identification of the specimens

The collected specimens were identified by referring to Day (1889) and Tawlwar and Jhingran (1991).Systematic position of *Glossogobius giuris* was recorded from internet sources.

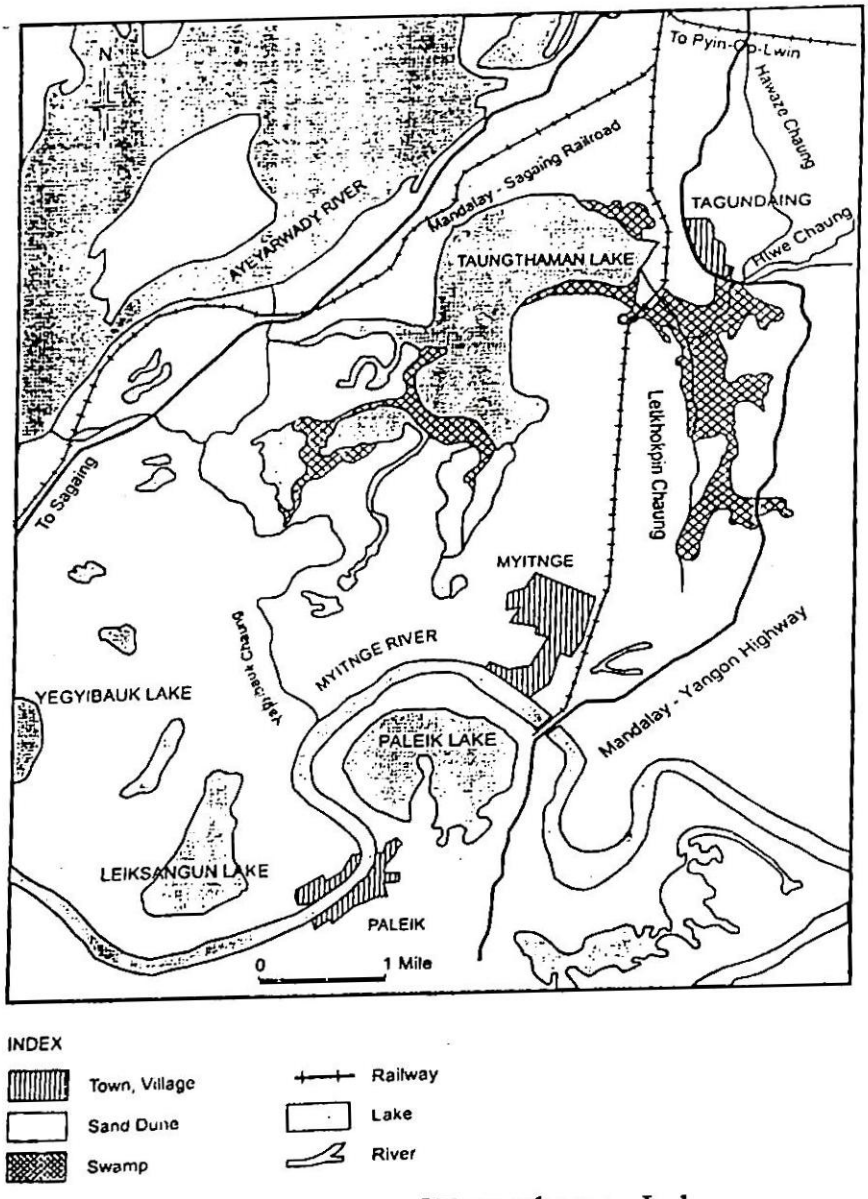


Fig 1. Map showing the locaton of Taungthaman Lake

Observations and Results

Systematic position and general descriptions of Glossogobius giuris

Phylum	-	Chordata
Group	-	Craniata
Sub phylum	-	Gnathostomata
Super class	-	Pisces
Class	-	Osteichthyes
Sub class	-	Actinopterygii
Order	-	Perciformes
Sub order	-	Gobioidei
Super family	-	Gobioidae
Family	-	Gobiidae
Genus	-	*Glossogobius*
Species	-	*G. giuris* (Hamilton,1822)
	-	*Glossogobius giuris*
Common name	-	Bar-eyed goby, Flat head goby, Tank goby
Vernacular name	-	Ka-tha-poe, Nylon nga (Mandalay Division)
	-	Nga lone (Sagaing Division)

Genus - *Glossogobius*

Body elongate, interiorly cylindrical and posteriorly compressed. Head depressed, snout elongate, head scaled behind eyes; cheeks and operculum naked. Gill opening from below near of preopercle to below eye; isthmus narrow; inner edge of shoulder girdle without fleshy flaps. Mouth slightly oblique lower jaw promient; maxilla reaching to below front half of eye; tongue bilobed; teeth on both jaws in several rows. Dorsal fins separate; pelvic fins form disc. Scales ctenoid on head and cycloid on body.

Fin Formula

B. IV ; D_1. VI ; D_2. I / 8-9 ; P. 17 - 18 ; V. I / 5;
A. I / 8 ; C. 15 -17 ; L.l. 28 - 31 ; L.tr.9

B	=	Branchiostegal rays
D_1	=	First dorsal fin
D_2	=	Second dorsal fin
P	=	Pectoral fin
V	=	Ventral fin
A	=	Anal fin
C	=	Caudal fin
L.l	=	Lateral line
L.tr	=	Lateral transverse

Habitat

The goby is found in rivers, ponds, lakes and some dams.

Food habit

The goby is carnivorous. The species mainly feeds on small fishes, molluscs and insects. It is also cannibalism. Cannibalism means an animal that eats the flesh of other animals of the same kind.

Cannibalistic type

The goby is cannibalism. The specimens from Taungthaman Lake are cannibalistic types.

Types of snouts

The snouts of specimens from Sagaing are more bluntly pointed than those of Taungthaman Lake.

Body lateral scales

The body lateral scales of specimens from Taungthaman Lake and those from Sagaing ranged between 28 -31.

Parasites

Contracaecum sp, red nematodes were found in the gut of Taungthaman Lake specimens. They protrude through the body wall and gills of the fish. The high numbers of nematodes were observed in the fish from November 2004 to March 2005. The numbers of nematodes in November 2005 to January 2006 were less than the previous year. Although there were no parasites in the specimens from Sagaing.

Colouration

The specimens from Taungthaman Lake are yellow, brown blotches along sides and fins with stripes.

In Sagaing, the specimens are pale yellow, ventral fins are black and the other fins are white with black spots.

Statistical analyses

Based on Wilcoxon Singed Ranks Test, total length (TL) and standard length (SL) of male specimens from Taungthaman Lake and Sagaing have no significant differences ($P< 0.05$). Although total length (TL) and standard length (SL) of female specimens from Taungthaman Lake and Sagaing revealed significant differences.

Economic importance

The goby is edible. It is marketed mostly fresh.

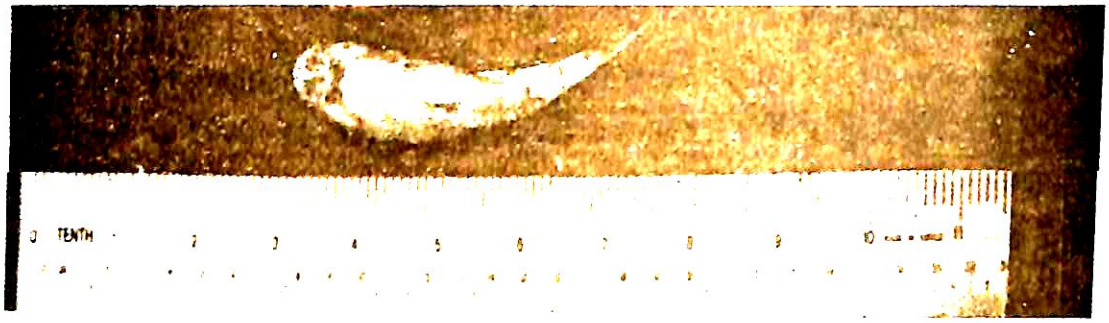
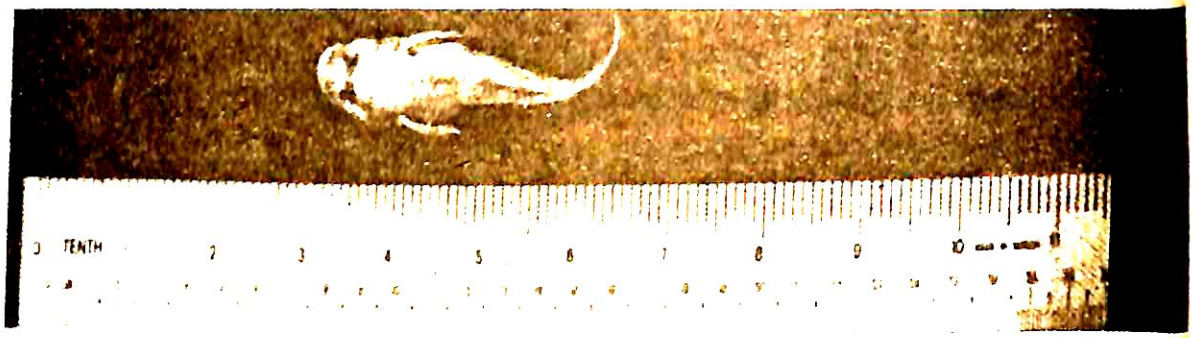


Fig. 2 *Glossogobius giuris* male from Taungthaman Lake



Fig, 3 *Glossogobius giuris* male from Sagaing

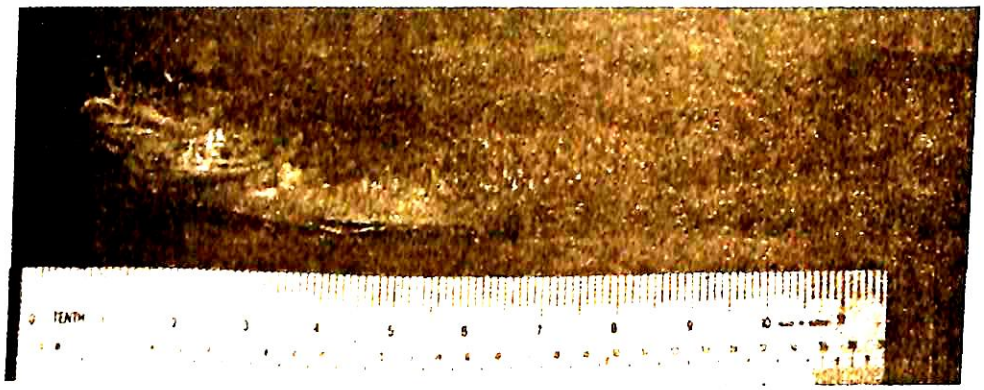


Fig. 4 *Glossogobius giuris* female from Taungthaman Lake

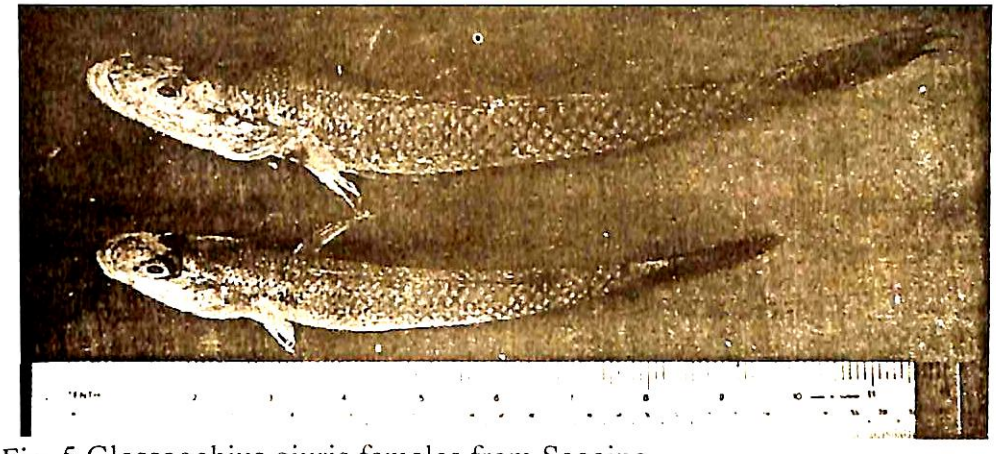


Fig. 5 Glossogobius giuris females from Sagaing

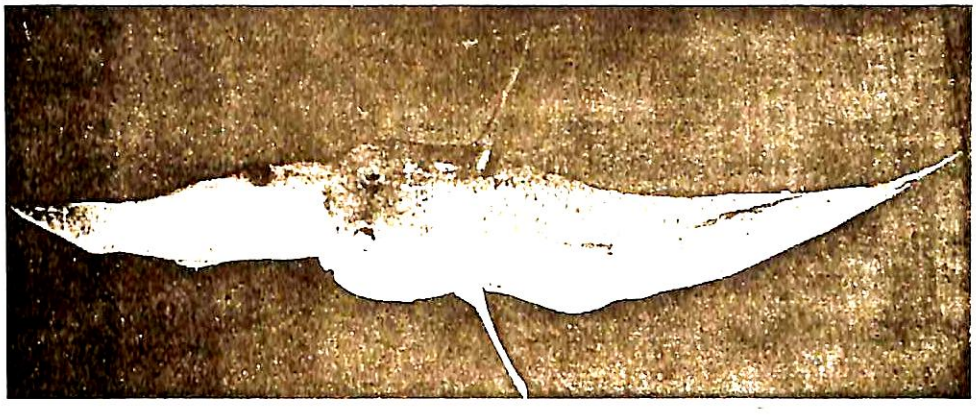


Fig. 6 Cannibalistic type of *Glossogobius giuris* from Taungthaman Lake

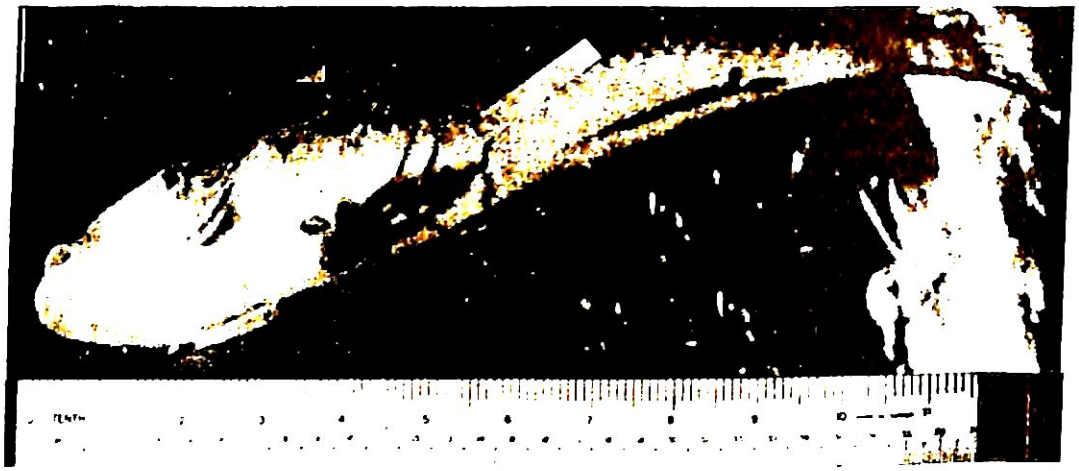


Fig. 7 *Glossogobius giuris* with parasites (Taungthaman Lake)

Table- 1 Ecological data recorded at the study sites.

No.	Collecting sites	pH	DO (mg/l)	COD (mg/l)	Temperature (°C)		BOD (mg/l)
					Water	Air	
1.	Taungthaman Lake	6.7 - 7.8	5.0-6.8	37.5 - 48.0	21.3-31.8	10.5-43.7	17.4
2.	Sagaing	7.4 - 7.7	6.4-6.7	10.3 - 40.1	19.3-30.6	13.0-42.5	12.6

Table-2 Descriptive statistics on *Glossogobius giuris* from Taungthaman Lake and Sagaing.

Dependent variable	Study sites	N	Minimum (cm)	Maximum (cm)	Mean	Standard Deviation	Standard Error
Total length	Taungthaman Lake	250	5.0	16.5	9.72	1.9682	0.2762
Total length	Sagaing	250	5.2	11.7	9.052	1.3636	0.1955
Standard	Taungthaman	250	3.8	13.1	7.824	1.7072	0.2553

Dependent variable	Study sites	N	Minimum (cm)	Maximum (cm)	Mean	Standard Deviation	Standard Error
length	Lake						
Standard length	Sagaing	250	4.0	9.4	6.822	1.2100	0.1955
Snout length	Taungthaman Lake	250	0.4	1.2	0.762	1.1905	0.0313
Snout length	Sagaing	250	0.3	0.6	0.479	0.0877	0.0148

Table- 3 Chi-Square Test for Thaungthaman Lake specimens.

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	480.000	210	.000
Likelihood Ratio	250.079	210	.030
Linear-by-Linear Association	70.266	1	.000
N of Valid Cases	250		

Table- 4 Chi-Square Test for Sagaing specimens.

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	540.000	477	.024
Likelihood Ratio	243.618	477	1.000
Linear-by-Linear Association	54.467	1	.000
N of Valid Cases	250		

Chi-Square Test for Thaungthaman Lake specimens

Dependent variable.. SNOUT Method.. LINEAR

Listwise Deletion of Missing Data

Multiple R	.94311
R Square	.88945
Adjusted R Square	.88803
Standard Error	.06173

Analysis of Variance:

	DF	Sum of Squares	Mean Square
Regression	1	2.3916120	2.3916120
Residuals	250	.2972630	.0038111

F = 627.54445 Signif F = .0000

Chi-Square Test for Sagaing specimens

Dependent variable.. SNOUT Method.. LINEAR

Listwise Deletion of Missing Data

Multiple R	.96081
R Square	.92316
Adjusted R Square	.92184
Standard Error	.09539

Analysis of Variance:

	DF	Sum of Squares	Mean Square
Regression	1	6.3407540	6.3407540
Residuals	250	.5277460	.0090991

F = 696.85745 Signif F = .0000

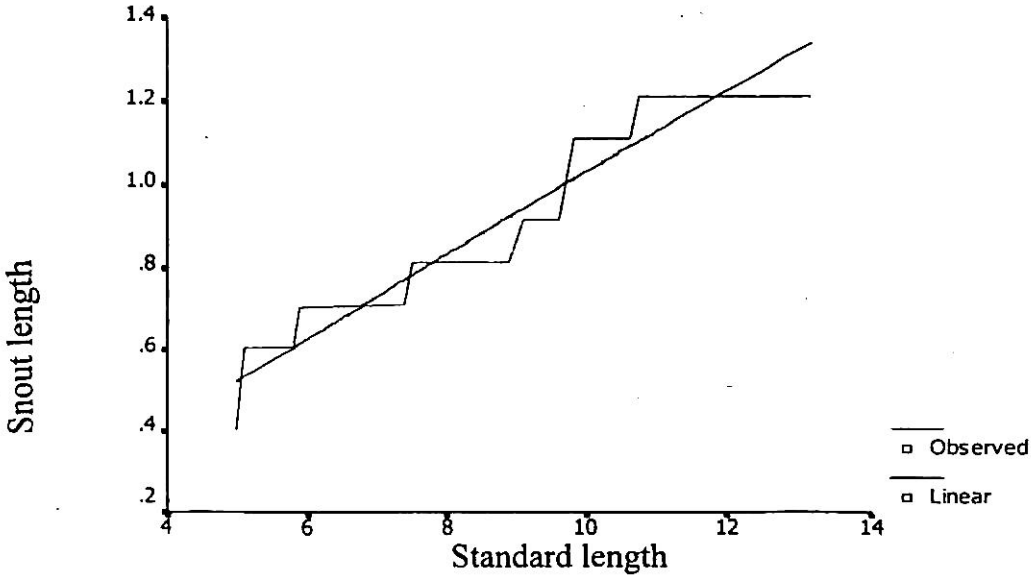


Fig. 8. Standard length and snout length relationship of Taungthaman specimens

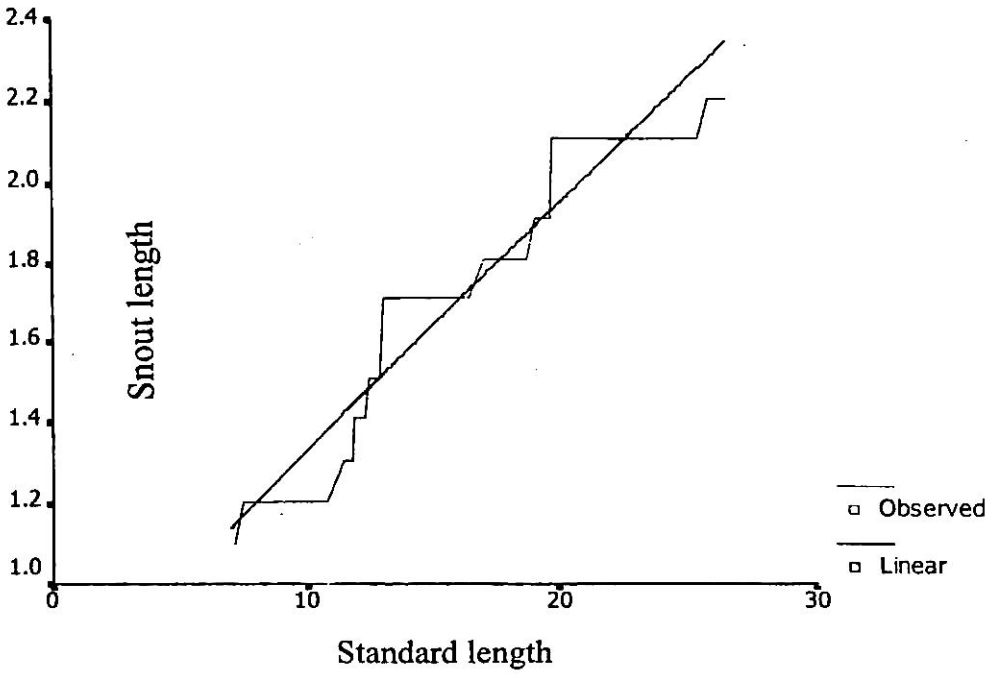


Fig. 9. Standard length and snout length relationship of Sagaing specimens

Table- 5 Descriptive statistics on males *Glossogobius giuris* between Taungthaman Lake and Sagaing

	Total length	Standard length	Snout length
Wilcoxon W	1308.500	1298.500	749.500
Z	-.473	-.586	.6.039
Asymp. Sig. (2-tailed)	.636	.558	.000

Grouping variable: Study sites

($P < 0.05$)

Table- 6 Descriptive statistics on females *Glossogobius giuris* between Taungthaman Lake and Sagaing

	Total length	Standard length	Snout length
Wilcoxon W	5973.000	6122.000	4023.000
Z	-3.909	-3.433	-10.342
Asymp. Sig. (2-tailed)	.000	.001	.000

Grouping variable: Study sites

($P < 0.05$)

Discussion

Specimens of fishes from Taungthaman Lake and ponds in Sagaing look quite similar to each other. In males, total specimens of fish length (TL) and standard length (SL) of Taungthaman Lake and Sagaing specimens have no significant difference ($P < 0.05$). Thus, the male specimens between Taungthaman Lake and Sagaing are not different in size. Although total length (TL) and standard length (SL) of the females from Taungthaman Lake and Sagaing revealed significant difference, this difference shows the different sizes between the specimens of Taungthaman Lake and Sagaing. According to Chi-square Test, snout length is correlated with increase in standard length of specimens from Taungthaman Lake and Sagaing (Fig. 8 and 9).

The pH value of Taungthaman Lake was more acidic than that of ponds in Sagaing. A pH value of 6.5 - 8.5 at daylight is the best for fish production. High and low pH can be particularly damaging to fish and other stream life as well as to essential microorganisms. The pH value is a critical factor in aquatic habitats.

The dissolved oxygen (DO) value of Taungthaman Lake was (5.0 - 6.8) mg / l while that of Sagaing was (6.7- 7.2). The DO requirement for all aquatic organisms is (8.0 - 10.0) mg / l. Generally dissolved oxygen levels in aquatic habitats must be greater than 6.5 mg / l for fish and aquatic organisms to survive. Many types of fish and bottom-dwelling animals cannot survive when levels of dissolved oxygen is below (2.0- 5.0) mg / l.

Temperature has great influence on the amount of DO. Warmer water contains less oxygen than cooler water. The water temperature of Taungthaman Lake was higher than that of Sagaing. Thus, the value of DO in Sagaing was higher than in Taungthaman Lake.

The biological oxygen demand (BOD) of Taungthaman Lake was higher than that of Sagaing. When the BOD of waste discharged into a stream is excessive, depletion of the stream's oxygen to satisfy this BOD causes fish suffocation, death of fish's natural food supplies, and a general upset of the streams ecology. High BOD indicates high microbial activity and suggests water pollution (Stanley,1995).

The chemical oxygen demand (COD) of Taungthaman Lake was higher than that of Sagaing. If the value of (COD) is high, the water will have high level of toxicity.

May Kyi Tun (1983) stated that there was no parasite on *Glossogobius giuris* found in Taungthaman Lake. From 2004 to 2006, the writer recorded that there were red nematodes and cysts on *Glossogobius giuris* found in Taungthaman Lake while not in Sagaing. According to the value of pH, DO, BOD and COD, the water quality of Taungthaman Lake was poor. Poor water quality becomes prime target for pathogens and parasites (Barnabe,1994). Poor fish quality depends on the numbers of fish parasites. Fish mortality may be correlated with the nematode infection (Fig. 7).

The maximum quantity of *Glossogobius giuris* was caught in August 2004 to December 2005. From the end of February 2005 to the second week of May 2005, the writer could not catch *Glossogobius giuris* from Taungthaman Lake and Sagaing. From the end of May 2005 to July 2005,

Glossogobius giuris was caught from Taungthaman Lake while not in Sagaing. From August 2005 to January 2006, *Glossogobius giuris* was caught from both Taungthaman Lake and Sagaing.

From August 2004 to August 2005, the writer caught *Glossogobius giuris* abundantly and recorded red nematodes and cysts on this species. However, from September 2005 to January 2006, the writer caught the numbers of *Glossogobius giuris* less than last year.

The water pollutants such as chemical, biological or physical materials degrade water quality. The water quality ultimately determines the survival and growth of cultured animals and plants (Dehadrai,1992). The productivity depends on the physico-chemical characteristics of the pond water (Tasveer,2005).

We should make the public know how to manage and control the overfishing. We must not catch fish as much as they are produced. During the breeding season, we do need to conserve the mature females with ovaries. We should protect the juveniles.

The faeces of housed animals should not discharge into lakes and ponds. Raw sewage, industrial wastes, detergents, agricultural fertilizers, pesticides and animal faeces make water pollution. To protect water pollution, we do need to end all pollution that discharges into lakes, ponds, dams, streams, wetlands and coastal waters. Floating solids are prohibited from discharge into streams and lakes because of their high pollution potential and unethical appearance.

Species survival in the long-term will depend on effective protection and management. Protection and management can only be improved with an increase in manpower and training.

Summary

- Although the specimens from both Taungthaman Lake and ponds in Sagaing are confined to the same species *Glossogobius giuris*, the specimens from the former site were observed to be larger than those of the latter area.
- Statistical analysis revealed that there is positive correlation between the standard length and the snout length.

- The water in Taungthaman Lake was observed to be more polluted than from the ponds in Sagaing.
- Parasitic nematodes and cysts were encountered both externally and internally in some specimens from Taungthaman Lake while no incidence was observed in these specimens procured from the ponds in Sagaing.
- There is a need to prevent further pollution in the aquatic ecosystem in order to sustain the aquatic fauna of the respective areas.

Acknowledgements

My indebtedness is also owed to U Maung Maung Khin, Rector, Mandalay University of Distance Education, for the opportunity to make this research and his encouragement.

I am very grateful to Daw Win Win Than, Professor and Head and Dr. Tin Tun, Professor, Department of Zoology, Mandalay University of Distance Education, for their advice and kind help in getting necessary references.

References

Day, F. (1967), *The Fishes of India including Burma and Ceylon*. Vol. II. New Delhi, India.

Jayarm, K.C.M. (1981), *The Freshwater Fishes of India, Pakistan, Bangladesh, Burma and Srilanka*, New Delhi, India.

Jordan, E.L. (2000), *Chordate Zoology*, Chand Co., Ltd. Ramnager. New Delhi, India.

Lagler, K.F. (1962), *The Study of Fishes*. John Wiley & Sons Inc. Topan Printing Co., Ltd.

May Kyi Tun (1983), *The internal parasites of some fishes of Taung-tha-man Inn*. M.Sc. Thesis. Mandalay University.

Nikolsky, G.V. (1999), *Ecology of Fishes*. Printed at Anis Offset Press, New Delhi, India.

Stanley, L. (1995), *Applied Science Review*. Springhouse Corporation. Printed in the United States of America.

Tasveer, Z. (2005), *Institute of Pure and Applied Biology*. Bahauddin Zakariya University, Multan, Pakistan.

Tawlwar. P.K. & A.G.K. Jhingran (1991), *Inland Fishes of India and Adjacent Countries*. Vol. II. New Delhi, India.

Thi Thi Naing (2005), *Prevalance of Nematode Infection in Glossogobius giuris* (Ham,1822); M.Res. Thesis. University of Mandalay.