

Monthly Occurrence and Composition of Fish Species at Are-Laung-Wei-Tode In (Lake) in Sagaing Township, Sagaing Region

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Abstract

A total of 42 species belonging to 32 genera and 18 families under eight orders were recorded during the study period of September 2014 to March 2015. The fishes were collected monthly at the landing sites. Collected fishes were identified down to species level. They were described with relevant photographs. Species composition showed highest in order Cypriniformes (38.1%) followed by Siluriformes (26.19%), Perciformes (19.05%), Synbranchiformes (7.14%) and the lowest (2.38%) was recorded in orders Osteoglossiformes, Clupeiformes, Cyprinodontiformes and Tetraodontiformes.

Keywords: fish species, occurrence, composition, Ayeyawady river

Introduction

Myanmar has a diverse and favorable range of agro-ecological zones with varying climatic conditions, land quality and stability for agricultural activities. This has enabled the country to be largely self-sufficient in basic food commodities, with surplus production of rice, pulses and fish in most years (FAO, 2011).

In developing countries such as Bangladesh, Myanmar, Nepal, Pakistan, and Sri Lanka in the Indian region, fish constitute one of the main food-item of substance for many people. Fish provides a staple diet and protein supplement and the abundant water resources support a good harvest (Jayaram, 2013).

Fish are valuable sources of high-grade protein and other organic products. They occupy a significant position in the socio-economic fabric of the South Asian countries by providing the population not only the nutritious food but also income and employment opportunities (Talwar and Jhingram, 1991).

The floodplain lakes of the Ayeyawady River are highly productive and play an important role in the ecology of the river system. The floodplain lake fauna includes diverse and productive fish community, which provides an important food source for villages along the river. All of these flood plains (Inn) are connected to the main Ayeyawady River Via water channels (Lowe-MC connell, 1977, 1978; Welcomme, 1979, 1985, cited by Thanda Tun, 2004).

Inland fisheries play an important role in contributing in supplying fresh fish and fisheries products for domestic consumption. Inland fisheries are most accessible and inexpensive source of protein for Myanmar people, it is thus important to the socio-economic and rural development of Myanmar (Department of fisheries Myanmar, 2006).

Most inland fish produce is consumed locally, marketed, domestically, and often contributes to the subsistence and livelihood of poor people (United Nation Environmental Programme, 1999).

Myanmar is rich in water resources and fishes are one of them. Inland freshwater bodies cover 8.1 million ha of which 1.3 million ha are permanent; the remainder seasonally inundated flood plains (Ins). The highest amount of fishes is produced from Ayeyawady Rvier and its flood-plains (Smith *et al.*, 2002).

Myanmar is located in the tropics with many different ecosystems and a great diversity of fish species. Are-laung-wei-tode In (Lake) is one of the 35 floodplains of Sagaing Township in the Dry Zone Belt of Myanmar. The study area is located in Sagaing Township,

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Sagaing Region. It lies about 4827.9 m away from the Sagaing and the supply of water is from the Ayeyawady. It is a considerably large In (Lake). It was probably natural but during the rainy season the water level rise and fairly extensive and flooded around the In environs. Most people who live in Are-laung-wei-tode In environs depend on that In for their livelihoods.

Thus, the present work has been undertaken with the following objectives:

- to record the fish species in Are-laung-wei-tode In (Lake)
- to determine the species composition based on the monthly occurrence

Materials and Methods

Study Area

Are-laung-wei-tode In (Lake) is situated in Sagaing Township, Sagaing Region. It lies between 21° 56' 03.00" and 96° 42.81" E (Plate. 1).



Study Period

The specimen collection was conducted from September, 2014 to March, 2015.

Plate.1 A map of study area
(Source from Google Earth)

Specimen Collection and Preservation

Specimens used in the study were collected from the local fishermen on monthly basis throughout the study period. Most fishermen used beach seine net (Wum Pu gyi), to catch fish. The collected specimens were examined and recorded soon after they were caught before the body color disappeared. Data of fish was noted and coloured photographed taken soon after catch. The external characters and measurements were noted in fresh state. The fish were preserved in different formalin according to of the specimens for the future identification. The local names of the species were as informed by the local fishermen.

Identification and Classification

Fishes were identified with the help of Keys in Talwar and Jhingram (1991) and Ferraris (1998) Jayaram (2013). The classification of fish was followed after Jayaram (2013).

Data Analysis

The data were analyzed as following (Bisht, *et al.* 2004).

Results

Species Composition of Fish

A total of (42) species confined to (32) genera and distributed among (18) families and eight orders were recorded during the study period (Table. 1). The collected fish species were described with relevant photographs in (Plate 2-4). Monthly occurrence of fish species from Are-laung-wei-tode In (Lake) were shown in (Table. 2).

The recorded eight orders were osteoglossiformes, Clupeiformes, Cypriniformes, Siluriformes, Cyprinodontiformes, Synbranchiformes, Perciformes and Tetraodontiformes. Of these orders, the highest percentage of speices composition was found in order Cypriniformes (38.1%) and the lowest percentage of species composition were found in order Osteoglossiformes (2.38%), Clupeiformes (2.38%), Cyprinodontiformes (2.38%) and Tetraodontiformes (2.38%) (Fig.1).

The most dominant order cypriniformes is confined to two families, 11 genera and 16 species. The second dominant order Perciformes confined to six families, six genera and eight

species, followed by siluriformes confined to five families, nine genera and eleven species and followed by Synbranchiformes confined to one family, two genera and three species, followed by Clupeiformes confined to one family, one genera and one species. The less dominant order Osteoglossiformes, Clupeiformes, Cyprinodontiformes and Tetraodontiformes and each one is confined to one family, one genera and one species.

The most dominant genus are *Labeo* with four species, the second dominant genus, *Mystus* and *Channa* with three species, the third dominant genus are *Osteobrama*, *Puntius* and *Macroganthus* with two species, and the rest of all other genera are presented by a single species (Table. 1)

Table. 1 Systematic position of fish species recorded from Are-laung-wei-tode In (Lake) during September 2014 to March 2015.

Order	Family	Scientific Name
1. Osteoglossiformes	1. Notopteridae	1. <i>Notopterus notopterus</i> (Pallas, 1769)
2. Clupeiformes	2. Clupeidae	2. <i>Gudusia variegata</i> (Day, 1869)
3. Cypriniformes	3. Cyprinidae	3. <i>Catla catla</i> (Ham., & Buch., 1822)
		4. <i>Cirrhinus mrigala</i> (Ham., & Buch., 1822)
		5. <i>Labeo boga</i> (Ham., & Buch., 1822)
		6. <i>Labeo calbasu</i> (Ham., & Buch., 1822)
		7. <i>Labeo rohita</i> (Ham., & Buch., 1822)
		8. <i>Labeo stoliczkae</i> (Steindachner, 1870)
		9. <i>Osteobrama belangeri</i> (Valenciennes, 1844)
		10. <i>Osteobrama cunma</i> (Day, 1878)
		11. <i>Puntius chola</i> (Ham., & Buch., 1822)
		12. <i>Puntius sarana</i> (Ham., & Buch., 1822)
		13. <i>Barbonymus gonionotus</i> (Bleeker, 1850)
		14. <i>Salmophasia sardinella</i> (Valenciennes, 1842)
		15. <i>Amblypharyngodon atkinsonii</i> (Blyth, 1861)
		16. <i>Aspidoparia morar</i> (Ham., & Buch., 1822)
		17. <i>Raiamas guttatus</i> (Day, 1869)
	4. Cobitidae	18. <i>Lepidocephalus berdmorei</i> (Blyth, 1861)
4. Siluriformes	5. Bagridae	19. <i>Sperata acicularis</i> (Serraris & Runge, 1999)
		20. <i>Mystus cavasius</i> (Ham., & Buch., 1822)
		21. <i>Mystus leucophasis</i> (Blyth, 1861)
		22. <i>Mystus pulcher</i> (Chaudhuri, 1911)
		23. <i>Hemibagrus menoda</i> (Ham., & Buch., 1822)
	6. Siluridae	24. <i>Ompok bimaculatus</i> (Bloch, 1797)
		25. <i>Wallago attu</i> (Schneider, 1801)
	7. Schilbeidae	26. <i>Clupisoma prateri</i> (Hora, 1937)
		27. <i>Eutropiichthys vacha</i> (Ham., & Buch., 1822)
	8. Sisoridae	28. <i>Gagata cenia</i> (Ham., & Buch., 1822)
	9. Loricariidae	29. <i>Pterygoplichthys disjunctivus</i> (Weber, 1991)
5. Cyprinodontiformes	10. Belonidae	30. <i>Xenentodon cancila</i> (Ham., & Buch., 1822)

Order	Family	Scientific Name
6. Synbranchiformes	11. Mastacembelidae	31. <i>Macrogathus aral</i> (Bloch & Schneider, 1801)
		32. <i>Macrogathus zebrinus</i> (Blyth, 1859)
		33. <i>Mastacembelus armatus</i> (Lacepede, 1800)
7. Perciformes	12. Ambassidae	34. <i>Parambassis ranga</i> (Ham., & Buch., 1822)
	13. Cichlidae	35. <i>Oreochromis</i> sp. (Peters, 1852)
	14. Gobiidae	36. <i>Glossogobius giuris</i> (Ham., & Buch., 1822)
	15. Anabantidae	37. <i>Anabas testudineus</i> (Bloch, 1795)
	16. Belontiidae	38. <i>Colisa labiosus</i> (Day, 1876)
	17. Channidae	39. <i>Channa marulius</i> (Ham., & Buch., 1822)
		40. <i>Channa orientalis</i> (Bloch & Schneider, 1801)
		41. <i>Channa striatus</i> (Bloch, 1793)
8. Tetraodontiformes	18. Tetraodontidae	42. <i>Tetraodon cutcutia</i> (Ham., & Buch., 1822)

Table. 2 Monthly occurrences of fish species from Are-laung-wei-tode In (Lake) during September 2014 to March 2015.

No	Species Name	Month							Total
		Sep	Oct	Nov	Dec	Jan	Feb	Mar	
1	<i>Notopterus notopterus</i>	+	+	+	+	+	+	+	7
2	<i>Gudusia variegata</i>	+	+	+	+	+	+	+	7
3	<i>Catla catla</i>	+	+	+	+	+	+	+	7
4	<i>Cirrhinus mrigala</i>	+	+	+	+	+	+	+	7
5	<i>Labeo boga</i>	+	+	+	+	+	+	+	7
6	<i>Labeo calbasu</i>	+	+	+	+	+	+	+	7
7	<i>Labeo rohita</i>	+	+	+	+	+	+	+	7
8	<i>Labeo stoliczkae</i>	+	+	+	+	+	+	+	7
9	<i>Osteobrama belangeri</i>	+	+	+	+	+	+	+	7
10	<i>Osteobrama cunma</i>	+	+	+	+	+	+	+	7
11	<i>Puntius chola</i>	+	+	+	+	+	+	+	7
12	<i>Puntius sarana</i>	+	+	+	+	+	+	+	7
13	<i>Barbonymus gonionotus</i>	+	+	+	+	+	+	+	7
14	<i>Salmophasia sardinella</i>	+	+	+	+	+	+	+	7
15	<i>Amblypharyngodon atkinsonii</i>	+	+	+	+	+	+	+	7
16	<i>Aspidoparia morar</i>	+	+	+	+	+	+	+	7
17	<i>Raiamas guttatus</i>	+	-	-	-	+	+	+	4
18	<i>Lepidocephalus berdmorei</i>	-	+	+	+	+	+	+	6
19	<i>Sperata acicularis</i>	-	+	+	+	+	+	+	6
20	<i>Mystus cavasius</i>	-	+	+	+	+	+	+	6

No	Species Name	Month							Total
		Sep	Oct	Nov	Dec	Jan	Feb	Mar	
21	<i>Mystus leucophasis</i>	-	+	-	+	-	+	+	4
22	<i>Mystus pulcher</i>	-	+	+	+	+	+	+	6
23	<i>Hemibagrus menoda</i>	-	-	-	-	+	+	-	2
24	<i>Ompok bimaculatus</i>	+	+	+	+	+	+	+	7
25	<i>Wallago attu</i>	+	+	+	+	+	+	+	7
26	<i>Clupisoma prateri</i>	+	+	+	+	+	+	+	7
27	<i>Eutropiichthys vacha</i>	+	+	+	+	+	-	-	5
28	<i>Gagata cenia</i>	+	-	-	-	+	+	+	4
29	<i>Pterygoplichthys disjunctivus</i>	-	-	-	+	+	+	+	4
30	<i>Xenentodon cancila</i>	+	+	+	+	+	+	+	7
31	<i>Macrognathus aral</i>	+	+	-	-	-	+	+	4
32	<i>Macrognathus zebrinus</i>	-	-	-	+	+	+	-	3
33	<i>Mastacembelus armatus</i>	+	+	-	+	+	-	-	4
34	<i>Parambassis ranga</i>	+	+	+	+	+	+	+	7
35	<i>Oreochromis sp.</i>	+	+	+	+	+	+	+	7
36	<i>Glossogobius giuris</i>	+	+	+	+	+	+	+	7
37	<i>Anabas testudineus</i>	-	-	+	-	+	+	+	4
38	<i>Colisa labiosus</i>	-	-	+	-	+	+	-	3
39	<i>Channa marulius</i>	-	-	-	+	+	+	+	4
40	<i>Channa orientalis</i>	+	+	+	+	-	+	+	6
41	<i>Channa striatus</i>	+	+	+	+	+	+	+	7
42	<i>Tetraodon cutcutia</i>	+	+	+	+	+	+	+	7
Total number of species		31	34	33	36	39	40	37	

+ = present

- = absent

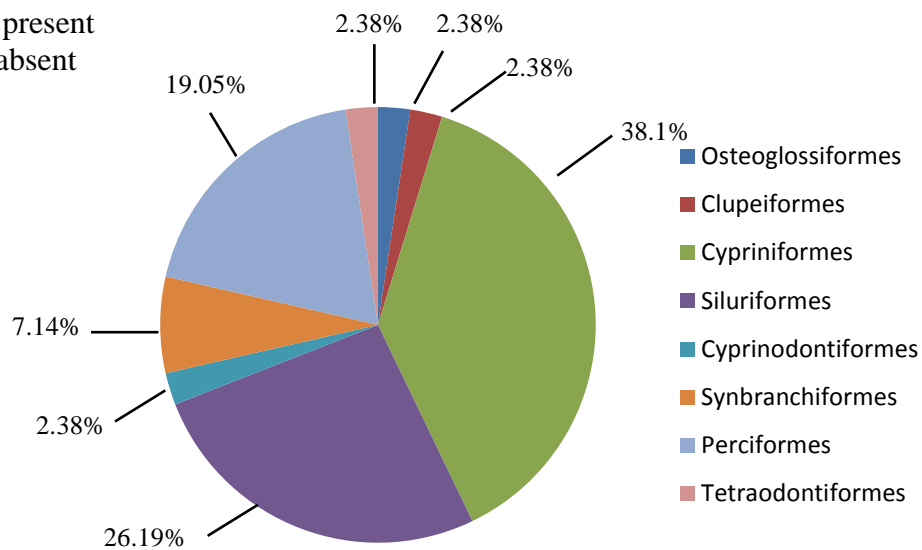
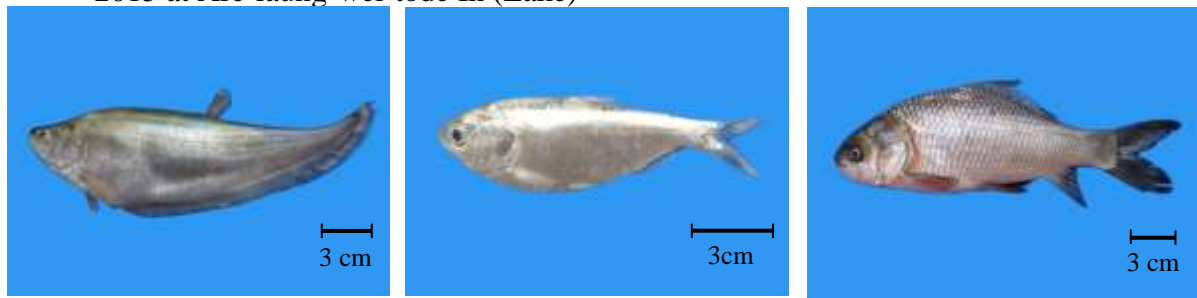


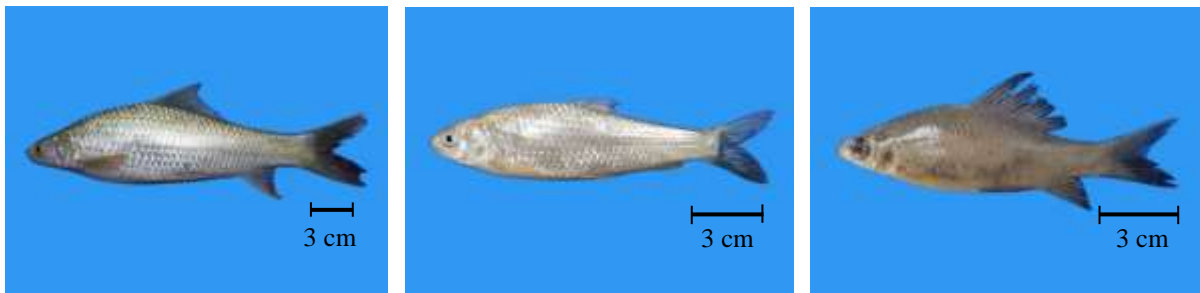
Fig. 1 Species composition of fishes in different orders during September 2014 to March 2015 at Are-laung-wei-tode In (Lake)



Notopterus notopterus

Gudusia Variegata

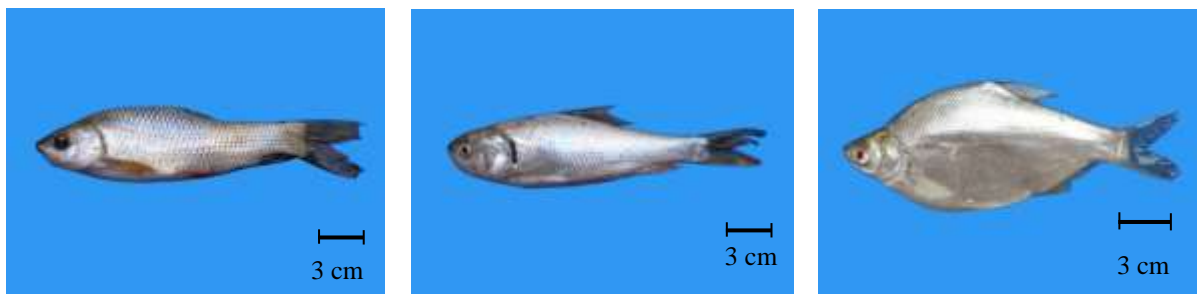
Catla catla



Cirrhinus mrigala

Labeo boga

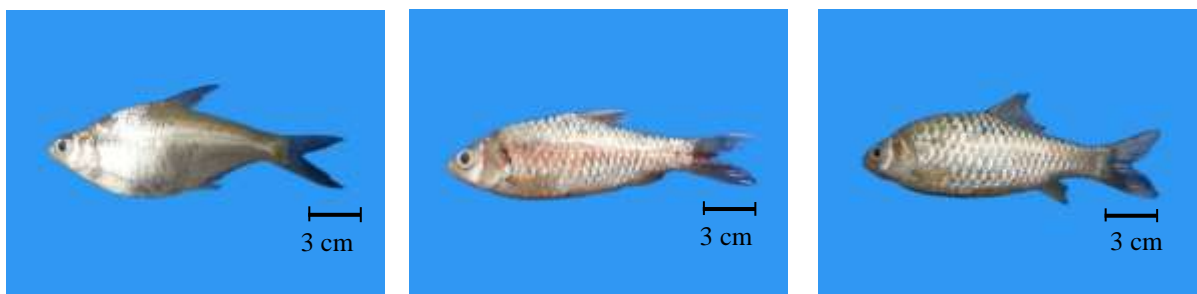
Labeo calbasu



Labeo rohita

Labeo stoliczkae

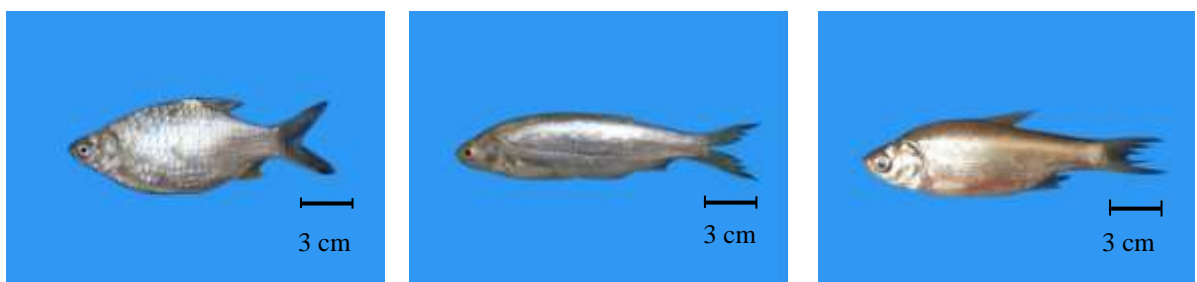
Osteobrama belangeri



Osteobrama cunma

Puntius chola

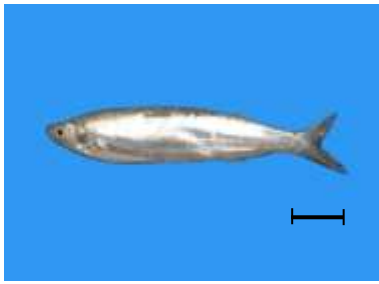
Puntius sarana



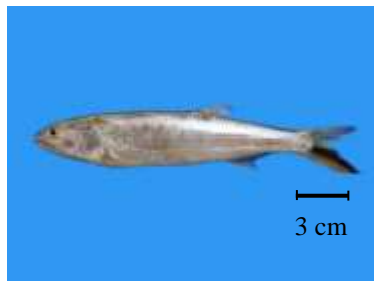
Barbonymus gonionotus

Salmophasia sardinella

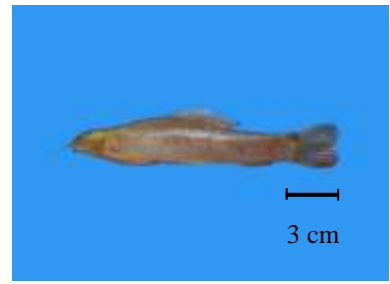
Amblypharyngodon



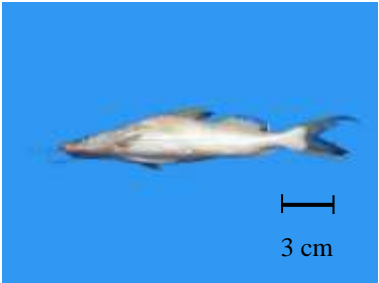
Aspidoparia morar



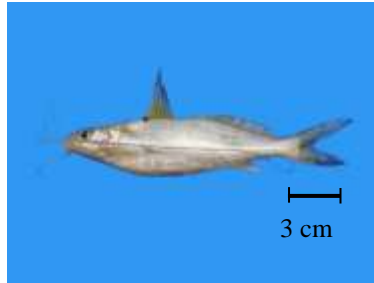
Raiamas guttatus



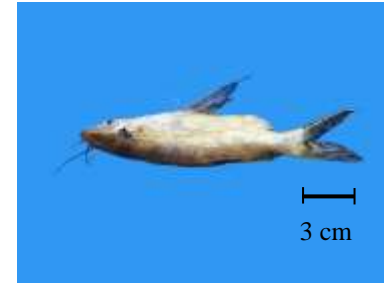
Lepidocephalus berdmorei



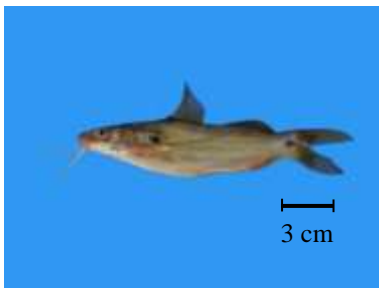
Sperata acicularis



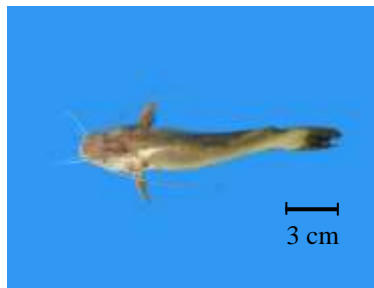
Mystus cavasius



Mystus leucophasis



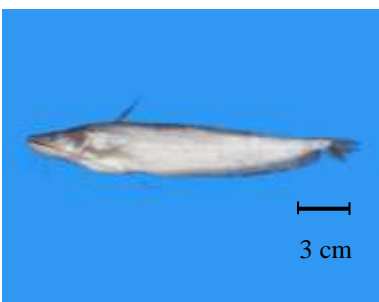
Mystus pulcher



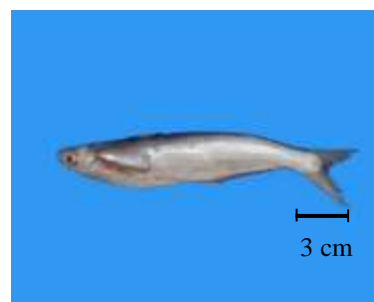
Hemibagrus memoda



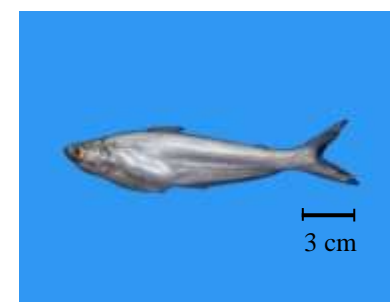
Ompok bimaculatus



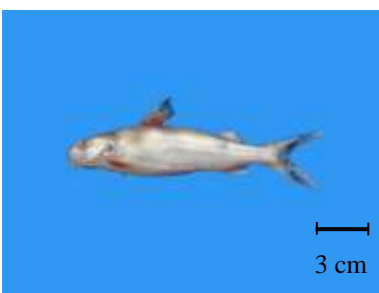
Wallago attu



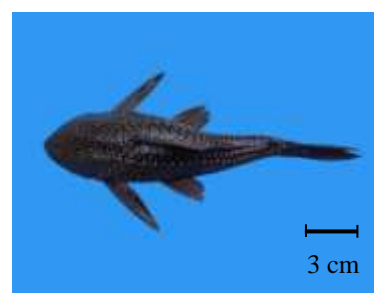
Clupisoma prateri



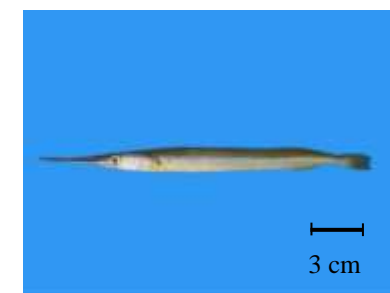
Eutropiichthys vacha



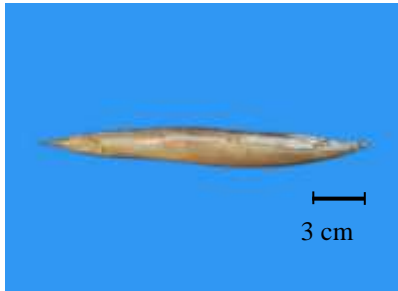
Gagata cenia



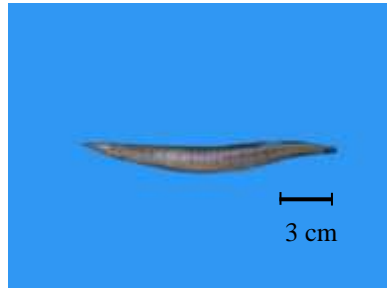
Pterygoplichthys disjunctivus



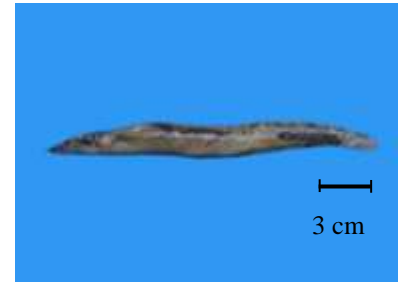
Xenentodon cancila



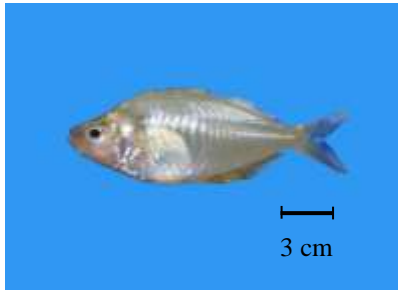
Macragnathus aral



Macragnathus zebrinus



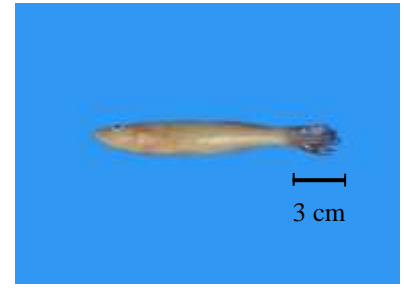
Mastacembelus armatus



Parambassis ranga



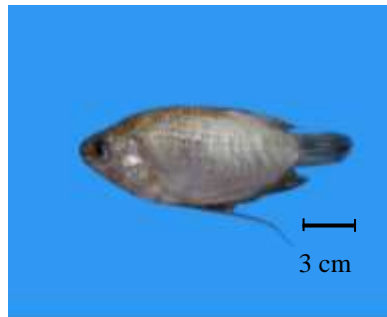
Oreochromis sp.



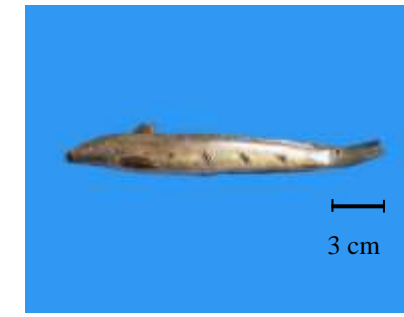
Glossobius giuris



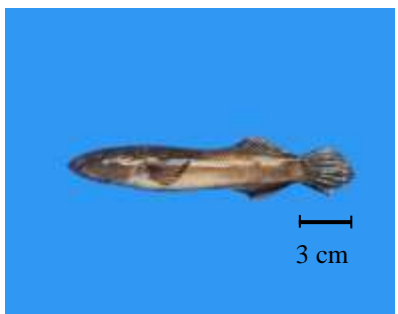
Anabas testudineus



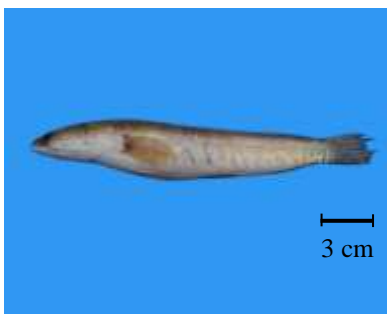
Colisa labiosus



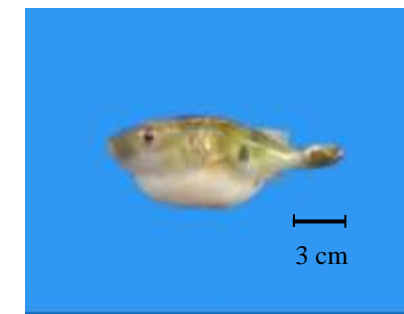
Channa marulis



Channa orientalis



Channa striatus



Tetraodon cutcutia

Discussion

In the study area, the order Cypriniformes is represented by 16 species, followed by Siluriformes with 11 species, followed by Perciformes with 8 species Synbranchiformes with 3 species. The remaining orders are represented with one species belonging to one genera and a single family each. Thus, it indicated that, the Cypriniformes, in terms of both genera and species, and the number of families encountered is higher than those of the remaining orders. Even the single family Cyprinidae is represented by 16 species confined to 11 genera.

This finding is an agreement with that of Lagler *et al.* (1962) who reported that cyprinids are the major freshwater fish group and thus become conspicuous parts of the fauna in different water bodies. In nature too, as the Cypriniformes constitutes the large number of species, the incidence of large number of cyprinids is assumed not surprising.

San San (2010) described 52 fish species in Inhlya In, Singaing Township, Myint Myint Win (2010) reported 70 fish species in Bodagon In, Pakokku Town ship and Mon Htwe Lwin (2011) stated 41 species of fish in Kaung-Hmu-Daw In, Singaing Township.

Compared with the finding of Mon-Htwe-Lwin (2011), although her study area is within the same township of present study the following fishes were recorded in the present study: *Notopterus chitala*, *Hilsa ilisa*, *Botia histrionica*, *Cyprinus carpio*, *Nemachelitus rubidipinnis*, *Monopterus albus*, *ronga*, *Rhinomugil corsula*, *Trichogster pectoralis* and *Channa punctatus*. However, some fishes such as *Barbonymus gonionotus*, *Lepidocephalus berdmorei*, *Mystus leucophasis*, *Clupisoma prateri*, *Gagata cenia*, *Pterygoplichthys disjunctivus*, *Mastacembelus armatus*, *Colisa labiosus*, *Channa marulius* and *Channa orientalis*, were recorded in this study, but not in Mon Htwe Lwin (2011).

Aye Aye Thin, (2013), described 36 fish species in Htanaungdaing In, Myingyan Township, Sanda Maung (2013), reported 43 fish species in Pauk In, Pakokku Township and Ni Ni Aye (2013) stated 36 fishes species in Sunye In, Sintkaing Township.

Comparison between the data of the pervious works and also with the data accumulated during the present work revealed that some of the fish species were common to all the In and some were not recorded in some of In. In the previous works-sucker mouthed armoured catfish was not included, however this fish has been recorded in the present study.

Thus, the differences in number of fish species between present work with Myint Myint Win (2010), Mon Htwe Lwin (2011), Aye Aye Thin (2013), Sanda Maung (2013) and Ni Ni Aye (2013) may be due to different environmental conditions and time factor.

Moreover, among these species, *Notopterus notopterus* is regarded as medium sized fish of high economic importance food fish in Southeast Asia. *Wallago attu* is also important as an export species of Myanmar (Vidthayanom *et al.*, 2005).

In the present study, some fish species were monthly recorded but some species were not. Among the monthly occurred species, *N.notopterus*, *C.catla*, *C.mrigala*, *L.calbasu*, *L.rohita*, *O.bimaculatus*, *W. attu*, *C. prateri*, *E. vacha*, *Oreochromis sp.*, *C.orientalis*, *C.striatus* are commercially important species. The rest of the species of the present work are not commercially important, however their catchment has been abundant, thus these species are also important for the fishers and fishery department.

Therefore, this In becomes an important role for food and economy of the local people. Most of the recorded species are more or less commercially important except *Tetraodon cutcutia*, which according to local people, is used as a medicinal food for children and as a food for fishermen from Are-laung-wei-tode In.

Fish and other aquatic resources are important to human livelihoods especially in many developing countries. In Myanmar, the fisheries sector is the fourth largest source of foreign exchange earnings after timber, mineral and rice (ADBS/ NACA, 1995). Therefore inland fishery including Are-laung-wei-tode In may have one of the major resources for the nutrition of local inhabitants.

Conclusions

Some fish species were recorded monthly but some species were not. In the previous works sucker-mouthed armoured catfish was not included, however this fish was recorded in the present study. Most of the recorded species were more or less commercially important except *Tetraodon cutcutia*, which according to local people, was used as a medicinal food for children and consumed by some fishermen after removing the skin fish and other aquatic resources are important to human livelihoods especially in many developing countries. Therefore, inland fishery including Are-laung-wei-tode In play a role of the major resources for the nutrition of local inhabitants.

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