

## Species Occurrence and Composition of Fish Fauna In Kyunmyityoe In, Ayeyarwady River Segment, Banmaw

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### Abstract

A study of the fish species occurrence and composition were undertaken during December 2017 to August 2018. A total of 57 species of fish belonging to 38 genera, 20 families and 8 orders were recorded from Kyunmyityoe In, Ayeyarwady river segment, Banmaw. Among the collected species order Cypriniformes was most dominant with 23 fish species (40%) followed by Siluriformes with 16 species (28%), Perciformes with 11 species (19%), Synbranchiformes with 3 species (5%), Clupeiformes, Osteoglossiformes, Beloniformes and Tetraodontiformes with one fish species (2% each). The largest number of species 46 species in each month of December and January and the smallest number of 20 species in April were recorded during the study period.

Key words: fish species, occurrence, composition, Kyunmyityoe In, Ayeyarwady River

### Introduction

Fishes form one of the most important groups of vertebrates, influencing its life in various ways. Fish diet provides protein, fats and vitamins A and D. A large amount of phosphorous and other elements are also present in it. They have a good taste and are easily digestible (Humbe *et al.*, 2014). Fishes have formed an important item of human diet from time immemorial and are primarily caught for this purpose.

Though the freshwater bodies contribute only 0.1% of the total water of the planet, it harbors 40% of fish species. Fish displays the greatest biodiversity of the vertebrates with over 27,500 species including 41 percent of freshwater species (Nelson, 1994 and 2006). An estimated 41% of fish lives in fresh water and 58 % in seawater and 1% between freshwater and seawater (Cohen, 1970). Out of a total of 1096 species of fish in Myanmar, 531 are in freshwaters and 595 are in seawaters (Fish base, 2018).

The Ayeyarwady River flows for over 1335 miles through the heart of Myanmar and is one of the largest rivers in Myanmar and most important commercial waterway. Originating from the confluence of the N'mai Kha and Mali Kha rivers, its flows relatively straight North-South before emptying through the Ayeyarwady Delta into the Andaman Sea (Wikipedia, 2018).

The Ayeyarwady is the engine of the Myanmar economy. It feeds the country's population with fish and rice, and enables goods to be transported to people up and down the river. Like rice, fish is a major contributor to Myanmar's national diet, estimated to account for approximately 60% of animal protein intake. The significant value attributed to fisheries, is especially dependent on a healthy Ayeyarwady River (World Wide Fund, 2018).

Myanmar fish production is composed of about 863,000 metric tons or 30% of inland capture fish, 1,062,000 metric tons or 37% of marine capture fish, and 942,000 metric tons or 33% of aquaculture fish. The Ayeyarwady Basin is the most important source of inland fisheries for the country. The overall number of fish species recorded in the Ayeyarwady Basin is 388, of which 311 are present in the Myanmar part. The others are being found in India and China. Among the 388 fish species, 193 (50 %) are endemic to the basin, and 100 (26 %) of the endemics are presently known only from Myanmar (WWF, 2018).

Kyunmyityoe In is one of the Ins situated on a long stretch of sandbank on the west of Banmaw in Kachin State. It is a natural flood-plain In formed by the flooding of Ayeyarwady River during the rainy season of each year. During the rainy season the area of the In is 2.8 ha

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with depth about 6.4 – 4.5 m and during hot season the area of the In is about 1.2 ha with depth about 2.4-0.9 m. According to the report of Banmaw Fishery Department, it supports fishery production about 8000 kg of fish annually. It is situated near the Kawn Hka village, Banmaw Township and located on a long stretch of sandbank at the junction of the two rivers, Ayeyarwady which originates from northern part of Myanmar and Tarping which originates from China. These two rivers unite near Banmaw. As these two rivers originate from different places, it will be of interest to study the fish fauna of the In.

Allen *et al.* (2010) highlighted in the status assessment of freshwater biodiversity in the eastern Himalayas that much of the Ayeyarwady Basin is species rich but still poorly known with numerous species still considered Data Deficient. Many segment areas in Ayeyarwady River are still needed to be surveyed and no one has worked on this In previously, Kyunmyityoe In was selected as a study site of the present work. The objectives of the present study are

- to identify the fish species from Kyunmyityoe In
- to record the fish species occurrence and composition from Kyunmyityoe In

## Materials and Methods

### Study Area and Study Period

This study was carried out at Kyunmyityoe In, located near the Kawn Hka village, Banmaw Township, Kachin State, approximately 4.8 km west of Banmaw Town. It lies at 24° 17' 47.885" N and 97° 12' 23.472" E (Fig.1). The study was carried out from December 2017 to August 2018.



Fig .1 Location map of Kyunmyityoe In  
(Source: Google)



(a) Gill net



(b) Cast net



(c) Lift net



(d) Trap



(e) Beach seines

Plate.1Fshing gears in the study area.

### **Collection of the specimens**

Specimen collection was made twice per month during the study period. At least five specimens were collected for each species. Samples were also collected from fish-landing centers with the help of local fishermen using different type of nets namely gill nets (tan-pike), beach seines (wun-bu-pike), trap (hmyone ), lift net (sakawar) and cast net (kun) (Plate.1). Photographic records were made soon after capturing the fish. The external morphological characters were taken from fresh forms. The local names as informed by the fishermen were also recorded.

### **Measurement and Preservation of the specimens**

The morphological characters and measurements were taken on the individual fish according to Lagler *et al.*, (1977).

Specimens were preserved in 5-10 percent formalin solution, depending on the size of fish. Larger specimens were first injected with 40 percent formalin inside of abdomen and dorsal for total fixation before preserving them in 10 percent formalin solution. Small specimens were first preserved in 10 percent formalin for 3 to 4 days and then preserved in 5 percent formalin.

### **Identification and classification of the specimens**

The preserved fish specimens were washed thoroughly under tap water and identified according to Day (1878, 1889), Jayaram (1981), Talwar and Jhingran (1991), and Ferraris (1998), Jayaram (2013). The identified specimens were arranged and presented according to the system of classification given by Jayaram (2013).

## **Results**

A total of 57 fish species belonging to 38 genera, 20 families under eight orders were recorded from Kyunmyityoe In, Ayeyarwady river segment, Banmaw.

### **Occurrence of fish species**

In the present study, a total of 57 freshwater fish species belonging to 38 genera and 20 families and 8 orders were identified and recorded from Kyunmyityoe In, Ayeyarwady river segment, Banmaw from December 2017 to August 2018 (Table.2 and Plate.2). The members of order Cypriniformes were dominated with 23 fish species, followed by Siluriformes with 16 species, Perciformes with 11 species, Synbranchiformes with three species, Osteoglossiformes, Clupeiformes, Beloniformes and Tetraodontiformes with one species each. Among the 57 species Cypriniformes was the dominant order with 3 families 14 genus and 23 species compared to other orders and families (Fig. 2).

The largest number of 46 species (16%) in each month of December and January and the smallest number of 20 species (7%) in April were recorded during the study period. Seasonal patterns in the variation of total number of species were recorded (Fig. 3).

### **Composition of fish species**

In the present study, the order Cypriniformes was most dominant constituting 40%, followed by Siluriformes constituting 28%, Perciformes constituting 19%, Synbranchiformes constituting 5%, and Osteoglossiformes Clupeiformes, Beloniformes and Tetraodontiformes constituting 1% each (Fig. 4).

Dominant families that were Cyprinidae with 20 species (35%), followed by Bagridae with six species (11%), Channidae with five species (9%), Schilbidae with four species (7%), Siluridae with three species (5%), Cobitidae, Clariidae, Mastacembelidae and Belontiidae with two species (4%). The other families were represented by one species each from Notopteridae,

Clupeidae, Balitoridae, Sisoridae, Belonidae, Synbranchidae, Ambassidae, Cichlidae, Gobiidae, Anabantidae and Tetraodontidae (2%) (Table 1).

Significant variation of fish species occurred in the eight orders in different months during the study period (Fig. 5).

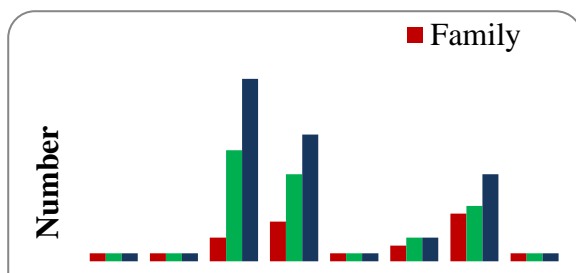


Fig. 2 Number of different taxa in different orders.

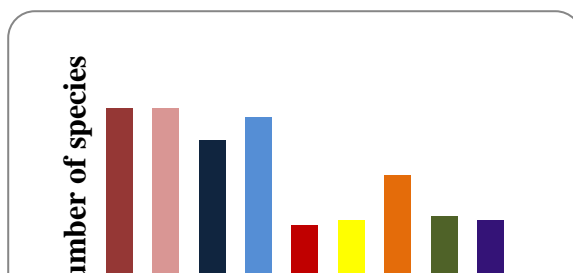


Fig.3 Monthly occurrences of fish species from Kyunmyityoe In.

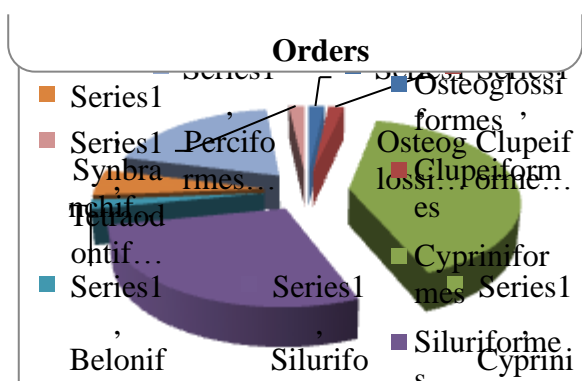


Fig.4 Percentage of fish species composition under different orders in Kyunmyityoe In.

Table.1 Percentage of fish species composition under different orders in Kyunmyityoe In.

Family	Number of species	Composition (%)
Notopteridae	1	2
Clupeidae	1	2
Cyprinidae	20	35
Balitoridae	1	2
Cobitidae	2	4
Bagridae	6	11
Siluridae	3	5
Schilbidae	4	7
Sisoridae	1	2
Clariidae	2	4
Belonidae	1	2
Synbranchidae	1	2
Mastacembelidae	2	4
Ambassidae	1	2
Cichlidae	1	2
Gobiidae	1	2
Anabantidae	1	2
Belontiidae	2	4
Channidae	5	9
Tetraodontidae	1	2
<b>Total</b>	<b>57</b>	<b>100</b>

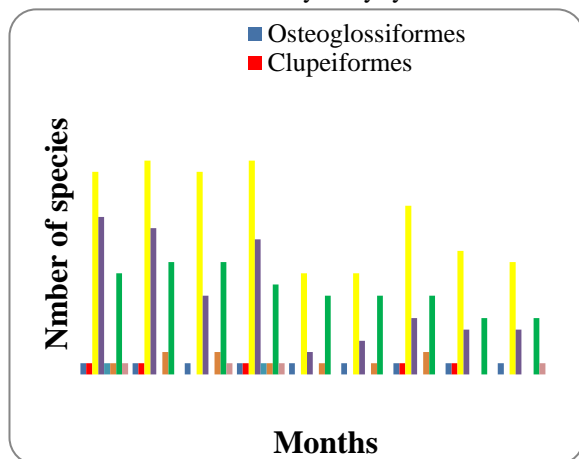


Fig.5 Monthly fish species composition in the orders recorded in Kyunmyityoe In

Table.2 List of some fish species collected from Kyunmyityoe In, Ayeyarwady River segment, Banmaw during December 2017 to August 2018.

Sr No	Order	Family	Scientific Name	Common Name	Vernacular Name
1	Osteoglossifor	1. Notopteridae	1. <i>Notopterus notopterus</i>	Featherback	Nga-phe, Nga pya
2	Clupeiformes	2. Clupeidae	2. <i>Gudusia variegata</i>	Burmese-river-shad	Nga-la-pi-bay-kyar
3	Cypriniformes	3. Cyprinidae	3. <i>Salmophasia sardinella</i>	Sardinella razorbelly minnow	Nga-yin-boung-zar or nga shae bar
			4. <i>Aspidoparia morar</i>	Aspidoparia	Nga-phyin or nga ma
			5. <i>Esomus danricus</i>	Flying barb	Nga-mort-tort
			6. <i>Rasbora rasbora</i>	Gabgetic scissortail rasbora	Nga-daung-zin or nga zin pyun
			7. <i>Amblypharyngodon</i>	Burmese carplet	Nga-byet
			8. <i>Amblypharyngodon mola</i>	Mola carplet	Nga-byet
			9. <i>Osteobrama belangeri</i>	Manipur osteobrama	Nga-hpant-ma
			10. <i>Osteobrama cunma</i>	Cunma osteobrama	Nga-lay-daung or nga za lon phyu
			11. <i>Puntius chola</i>	Swamp barb	Nga-hkone-ma-myi-ni
			12. <i>Puntius sarana sarana</i>	Olive barb	Nga-hkone-ma-toke
			13. <i>Puntius sophore</i>	Sportfin swamp barb	Nga-hkone-ma-me-kwet
			14. <i>Barbonymus gonionotus</i>	Silver barb	Thai-nga-hkone-ma
			15. <i>Cirrhinus mrigala</i>	Mrigal	Nga-gyin-phyu
			16. <i>Catla catla</i>	Catla	Nga-thaing-gaung-bwa
			17. <i>Labeo angra</i>	Angra-labeo	Nga-lu-myet-net
			18. <i>Labeo boga</i>	Boga-labeo	Kyauk-nga-lu
			19. <i>Labeo calbasu</i>	Kalbasu black rohu	Nga-net-pyar
			20. <i>Labeo rohita</i>	Rohu	Nga-myt-chin
			21. <i>Labeo stoliczkae</i>	Moulmein labeo	Nga-lee
			22. <i>Crossocheilus burmanicus</i>	Burmese latia	Nga-din-lone
		4. Balitoridae	23. <i>Acanthocobitis</i>	Cherry fin loach	Nga-the-le-doh/toe
		5. Cobitidae	24. <i>Botia berdmorei</i>	Blyth's loach	Nga-shwe-yee or nga saw
			25. <i>Botia histrionica</i>	Burmese loach	Nga-shwe-yee or nga saw
4	Siluriformes	6. Bagridae	26. <i>Sperata acicularis</i>	Long whiskered catfish	Nga-gyaung
			27. <i>Mystus bleekeri</i>	Day's mystus	Nga-zin-yaing-kyet-chay
			28. <i>Mystus cavasius</i>	Gangetic mystus	Nga-zin-yaing-hpyu
			29. <i>Mystus leucophasis</i>	Sittaung mystus	Nga-nauk-thwar
			30. <i>Mystus pulcher</i>	Pulcher mystus	Nga-zin-yaing
		7. Siluridae	31. <i>Hemibagrus menoda</i>	Menoda catfish	Nga-ngaik or Nga-aik
			32. <i>Ompok bimaculatus</i>	Buter catfish	Nga-nu-than
			33. <i>Ompok pabo</i>	Pabo catfish	Nga-nu-than
			34. <i>Wallago attu</i>	Boal freshwater shark	Nga-butt
		8. Schilbidae	35. <i>Clupisoma</i>	Burmese takree	Nga-myin-kyet-taung
			36. <i>Clupisoma prateri</i>	Burmese garua	Nga-myin-oak-phar
			37. <i>Eutropiichthys vacha</i>	Batchwa vacha	Nga-myin-kun-mar
			38. <i>Neotropius acutirostris</i>	Indian potasi	Nga-za-kar
		9. Sisoridae	39. <i>Gagata melanoptera</i>	Gangetic gagata	Nga-nan-gyaung
		10. Clariidae	40. <i>Clarias batrachus</i>	Magur	Nga-khu
			41. <i>Heteropneustes fossilis</i>	Stinging catfish	Nga-gyee
5	Beloniformes	11. Belonidae	42. <i>Xenentodon cancila</i>	freshwater garfish	Nga-phaung-yoe
6	Synbranchifor	12. Synbranchidae	43. <i>Monopterus albus</i>	Rice swampeel	Nga-shint-ni
		33. Mastacembelidae	44. <i>Macrogathus aral</i>	One-stripe-spiny eel	Nga-mway-ni
			45. <i>Mastacembelus armatus</i>	Spiny eel	Nga-mway-nagar
7	Perciformes	14. Ambassidae	46. <i>Pseudambassis ranga</i>	Indian glassy fish	Nga-zin-zat
		15. Cichlidae	47. <i>Oreochromis sp.</i>	Tilapia	Tilapia
		16. Gobiidae	48. <i>Glossogobius giuris</i>	Tank goby	Nylon-nga or ka-tha-boe

Table.2 Contined.

Sr No	Order	Family	Scientific Name	Common Name	Vernacular Name
		17. Anabantidae	49. <i>Anabas testudineus</i>	Climbing perch	Nga-pyay-ma
		18. Belontiidae	50. <i>Colisa labiosus</i>	Thick-lipped Gourami	Nga-phyin-tha-lat
			51. <i>Trichogaster pectoralis</i>	Snakeskin gourami	Nga-hpee-ma
		19 Channidae	52. <i>Channa marulius</i>	Giant snake head	Nga-yant-die
			53. <i>Channa panaw</i>	Panaw snakehead	Nga-panaw
			54. <i>Channa orientalis</i>	Asiatic snake head	Nga-yant-gaung-to
			55. <i>Channa punctatus</i>	Spotted snake head	Nga-yant-pa-naw
			56. <i>Channa striatus</i>	Striped snake head	Nga-yant-auk
8	Tetraodontiformes	20.Tetraodontidae	57. <i>Tetraodon cutcutia</i>	Ocellated puffer fish	Nga-pu-si or Nga-pu-tin

A. *Notopterus notopterus*B. *Gudusia variegata*C. *Salmophasia sardinella*D. *Aspidoparia morar*E. *Esomus danricus*F. *Rasbora rasbora*G. *Amblypharyngodon atkinsonii*H. *Amblypharyngodon mola*I. *Osteobrama belangeri*J. *Osteobrama cunma*K. *Puntius chola*L. *Puntius sarana sarana*

Plate. 2 Different fish species collected from Kyunmyityoe In, Ayeyarwady River Segment, Banmaw

M. *Puntius sophore*N. *Barbonymus gonionotus*O. *Cirrhinus mrigala*P. *Catla catla*Q. *Labeo angra*R. *Labeo boga*S. *Labeo calbasu*T. *Labeo rohita*U. *Labeo stoliczkae*V. *Crossocheilus burmanicus*W. *Acanthocobitis rubidipinnis*Y. *Botia berdmorei*X. *Botia histrionica*Z. *Sperata acicularis*A(a). *Mystus bleekeri*

Plate.2 Contined.

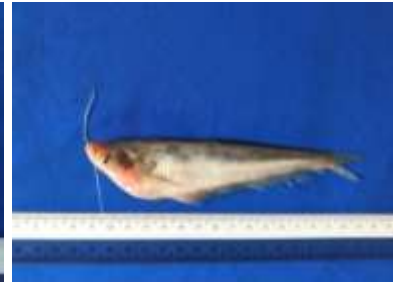
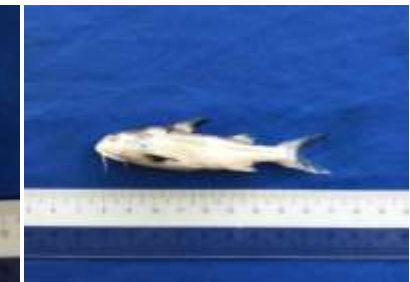
A(b). *Mystus cavasius*A(c). *Mystus leucophasis*A(d). *Mystus pulcher*A(e). *Hemibagrus menoda*A(f). *Ompok bimaculatus*A(g). *Ompok pabo*A(h). *Wallago attu*A(i). *Clupisoma macrophthalmus*A(j). *Clupisoma prateri*A(k). *Eutropiichthys vacha*A(l). *Neotropius acutirostris*A(m). *Gagata melanoptera*A(n). *Clarias batrachus*A(o). *Heteropneustes fossilis*A(p). *Xenentodon cancila*

Plate.2 Continued.



A(q). *Monopterus albus*A(r). *Macrognathus aral*A(s). *Mastacembelus armatus*A(t). *Pseudambassis ranga*A(u). *Oreochromis* sp.A(v). *Glossogobius giuris*A(w). *Anabas testudineus*A(x). *Colisa labiosus*A(y). *Trichogaster pectoralis*A(z). *Channa marulius*B(a). *Channa panaw*B(b). *Channa orientalis*B(c). *Channa punctatus*B(d). *Channa striatus*B(e). *Tetraodon cutcutia*

Plate.2 Continued.

### Discussion

The present study revealed a total of 57 fish species of 38 different genera 20 families and 8 orders from the Kyunmyityoe In, Ayeyarwady River segment, Banmaw carried out during December 2017- August 2018.

Cypriniformes dominated the fish fauna of study area with 23 fish species, followed by Siluriformes with 16 species, Perciformes with 11 species, Synbranchiformes with three species, Clupeiformes, Osteoglossiformes, Beloniformes and Tetraodontiformes with one species each. The wise the percentage composition are the highest in order Cypriniformes 40% followed by Siluriformes (28%), Perciformes (19%), Synbranchiformes (5%), Clupeiformes, Osteoglossiformes, Beloniformes and Tetraodontiformes (2%) each.

Cypriniformes is the most dominant order holding maximum number of species in percentage when compared to other seven orders. Talwar and Jhingram reported that Cypriniformes is the largest order of freshwater fish group.

Many local researchers have been carried out on the occurrence and composition of fish species in different area. Among them, Naw Htoo Di (2018) and Khin Yee Mon Khaing (2017) reported that the fishes of order Cypriniformes and Siluriformes were dominant species in their study area.

Shinde *et al.*, (2009) reported the fish diversity of Pravara River, Pravara Sangam Dist, Ahmednagar (M.S.) India. They mentioned reveal the occurrence of 41 fish species in their study area. Among the collected species order Cypriniformes was most dominant constituting 50 % followed by order Siluriformes constituting 19 % and order Perciformes constituting 14.28 %. The result of the present study is the same as those of previous local and oversea works.

In the present study, Cyprinidae family was more dominant with 20 species. Many researchers reported the strong dominance of Cyprinidae family in their investigations. Among them, Thidar Win (1998), Lazat Lum Nyo (1996) and Win Thein Oo (1991) reported that the fishes of the Cyprinidae family were dominant species in the Upper Ayeyarwady river. Sakhare (2001) reported that the occurrence of 23 species in Jawalgaon reservoir Solapur district Maharashtra, where Cyprinidae family is dominant with 11 species. Among the families, the Cyprinidae comprised the highest number of species as they are the most common species found in Ayeyarwady River. This is similar with previous studies by Khin Saw Yu (1993), Ma Ohn, (2000) and Myint Myint Than (1988) in Ayeyarwady River, Magway Region.

High number of both species and individuals were captured in December and January, afterward declined in February. But it can also be seen that the higher capture of fish species was in March by Hmaw. Then capture of fish species fall from April to August.

*Notopterus notopterus*, *Osteobrama belangeri*, *O. cunma*, *Puntius sophore*, *Labeo angra*, *L. boga*, *Mystus cavasius*, *Pseudambassis ranga*, *Oreochromis* sp., *Glossogobius giuris*, *Anabas testudineus* and *Colisa labiosus* were found throughout the study period in Kyunmyityoe In at Ayeyawady river segment, Banmaw. *Botia histrionica*, *Sperata acicularis*, *Hemibagrus menoda*, *Heteropneustes fossilis*, *Xenentodon cancila*, *Monopterus albus* and *Channa marulius* were found rare while *Esomus danricus* once in March and *Gagata melanoptera* in June only during the study period. *C. panaw*, *C. orientalis*, *C. punctatus* and *C. striatus* fish species were found abundant during January and February. Three species, namely *Amblypharyngodon mola*, *P. chola* and *P. ranga* were found abundantly in March.

There were three exotic species recorded namely *Barbonymus gonionotus*, *Oreochromis* sp. and *Trichogaster pectoralis*. The accidentally introduction of exotic fish, *Pterygoplichthys disjunctivus* has occurred throughout the year in central and lower region of Ayeyawady river (Thant zin Tun, 2015 and Khin Yee Mon Khaing, 2017). It can compete and

replace the native fishes, which may lead to reduce biodiversity. However, this species did not occur in the present study.

The two Clupeoids, *Gudusia variegata* has been found and the prominent commercially species *Hilsa ilisha* has not been found in the present study. Among the fishes *H. ilisha* also migrates in the river to breed in the rainy season. *H. ilisha* was recorded only by Thidar Win (1998) from Ayeyarwady River, Katha District of Sagaing Region, thus it seems that this species could not be distributed in the recent years at the upper region of Ayeyarwady river from environmental changes or overfishing by human. Moreover, *B. gonionotus*, *G. melanoptera* and *C. panaw* have been found in the present study but have never been reported in the previous works. And then, *Danio* sp., *Garra lamta*, *Glyptothorax telchitta*, *Microphis dunckeri*, *Indostomus paradoxius* and *Parasphaerichthys ocellatus* have also been reported in Ayeyarwady River, Myitkyina Township by Lazat Lum Nyo (1996) but have never been reported in the other works.

Kyunmyityoe In also plays an important role in fish production for the consumption of local people. In Kyunmyityoe In, most of the fishing gears and methods used are the same as in other parts of the country, using gill nets (tan-pike), beach seines (wun-bu-pike), trap (hmyone), lift net (sakawar) and cast net (kun). Among them, lift net (sakawar) was used only in the raining season at the study site.

The size of fish depends on the availability of food and habitat. The length or other physical dimension including weight of fish can be influenced by environmental factor (Shukor *et. al*, 2008, Jobling *et. al*, 2002). The present study observed that the commercial size of fish species like *Wallago attu* (4.8 kg) was recorded in December. But it could not be seen large size of the commercial important Schilbidae and Cyprinidae groups once in the study period.

### Conclusion

Kyunmyityoe In leasable fishery is based on naturally recruited. It contains a moderate occurrence and composition of fish fauna and it is dominated by the cyprinids. The number of species and its maximum size of fishes are very important for sustainable management in the water body. Hence, further study is required to conduct in order to improve understanding on species richness and diversity of fish fauna. This study would support the management of natural and aquatic environmental resources. It is expected that the information would be helpful to converse fisheries sources of Ayeyarwady River in a sustainable manner.

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