Assessment of Some Freshwater Fishes in Ayeyarwady River Segment, between Kunnya and Seikkanthaya Villages, Pakokku township, Magway Region, Myanmar

Htay Htay Win
Associate Professor, Department of Zoology, Shwebo University

*Corresponding author, Email address: drhtayhtaywin@gmail.com

Abstract

The study was conducted to assess the species composition and commercial value of some freshwater fishes in Pakokku environ from December 2013 to February 2014. Fish specimen was collected weekly with the help of fishermen in fish catching sites. The collected specimen was brought to laboratory for systematic identification. A total number of 45 species of freshwater fishes belong to seven Orders, 21 families and 35 genera were collected from Pakokku environ. The percentage of species composition was recorded to be highest under Orders Siluriformes (35.52%), followed by Cypriniformes (24.42%), Perciformes (22.2%), Synbranchiformes (8.88%), Clupeiformes (4.44%) and in each of the remaining two orders Osteoglossiformes (2.22%), and Beloniformes (2.22%) respectively. Three types of fishing gear were recorded in this study site. The main commercial 15 species were recorded in this study sites. This research is concluded that, the freshwater fish being get from the inland capture fisheries provided not only daily diet but also livelihood of the majority of people living in Pakokku environ.

Keyword: Freshwater fishes, composition, gear
1. Introduction

Myanmar has extensive inland water bodies of 8.1 million ha which include natural lakes reservoirs and ponds. It has three river systems: these are Ayeyarwady River, Chindwin River and Thanlwin River. The Ayeyarwady is one of the largest rivers in the world. The Ayeyarwady is the most important of three main rivers in Myanmar (Lowe-McConnell, 1989; Welcomme, 1979, 1985).

Of the 21,723 fish species known to science, over 40% live in freshwater and majority of them live in tropics. The variety of river, lake, Inn and high estuary ecosystems of Myanmar support rich fish diversity. Inland people depend mainly on freshwater fish and hence they are of commercial importance. Fishery works are made in river, canals and streams throughout the year (Nelson, 1976).

Throughout the centuries fish has been an important component of the population’s diet in many parts of the world. Fish meat is taken as fresh, dried, salted, paste and a sauce in place of common salt. Inland fisheries play an important role in contributing in supplying fresh fish and fisheries products for domestic consumption (Khin Maung Soe, 2008).

Most inland fish produce is consumed locally, marketed domestically, and often contributes to the subsistence and livelihood of poor people (UNEP, 2002).

Fishing in inland water has been in practice since the ancient times and fishing tools have been found among the earliest human remains. Many different methods of fishing and types of fishing gear have emerged over the centuries and are still in use, however and further development has taken place to meet local condition (Welcomme, 2001).
The Asia Silurid catfish *Wallago attu* is an endangered species. Populations are declining due to overharvesting, pollution, and destructive fishing practices (Hossain *et al.*, 2008).

The Riverine area (Kunnywa and Seikkanthaya villages) is selected as a study site. The fishermen being this site capture the fish throughout the year.

As Myanmar is the largest and an ecologically highly diverse country in Southeast Asia, it has an especially area now coming up along with the socio-economic development activities in the country.

Kunnywa and Seikkanthaya villages are located in Pakokku Township, Magway Region. These villages lie the west of the Ayeyawady River. These environs, the study areas, chosen is a large water body of Ayeyawady river segment. The two study sites (Kunnywa and Seikkanthaya villages) are abundantly fish catching sites along the river in the study area. These are essential fishery work sites. Some of the profession of villagers is fishery. Economy of Kunnywa (SiteI and Seikkanthaya (SiteII) are mostly depend on fishing and produce the highest amount of fishes for Pakokku urbanized and it around rural markets. Therefore, the observation conducted with to identify and composition of freshwater fish from Kunnywa and Seikkanthaya villages.

### 2. Materials and Methods

The study was conducted at segment of Ayeyawady river between the Kunnywa and Seikkanthaya Villages (Pakokku Township) from December 2013 to February 2014. The study area, Kunnywa and Seikkanthaya villages are located in Pakokku Township, Pakokku District of Magway Region. Kunnywa (SiteI) lies at the North East part of Pakokku Township between \( N 21^\circ 23' 32.70'' \) and \( E 95^\circ 10' 39.44'' \).
Seikkanthaya (Site II) lies at the North East part of Pakokku Township between N 21° 23’ 0.762” and E 95° 12’ 49.44” (Figure 1).

![Figure 1 Location map of study area](image)

**Collection of the specimens**

Fish specimens were collected weekly at fishermen in the catching site. Ten specimens for each species were collected and studied. Photographs of the fresh specimens were soon taken after the catching. The morphological characters, coloration and measurements of species were taken according to the method of Lagler *et al.* (1962).

During the study period, the three types of fishing gear used in collecting the fish specimens were recorded in this study area.

**Preservation of the specimens**

The collected specimens were preserved in 10 percent formalin and brought to the laboratory for further identification.
Identification of the specimens

Local names of the studied species were noted as informed by the local fishermen. Identification, Classification and Diagnostic characters were followed after Day (1878, 1889), Jayaram (2010) and Talwar and Jhingran (1991), Axelord and Schultz (1995).

Data analysis

Species composition was calculated as follows:

$$\text{Species composition} = \frac{\text{No. of particular species}}{\text{Total No. of species}} \times 100$$

3. Results and Discussion

A total of 45 species, 35 genera, 21 families of seven orders were observed during study period (Table. 1 and Figure 2)

![Figure 2 Percent composition of fish species in orderwise](image-url)
Fishing gears utilized in Kunnywa and Seikkanthaya

According to the recorded data, three types of fishing gear were used in the study area during study period. These were set gill net (tan-paik), set gill net (wri-ta-paik) and drift gill net (sweh paik).

Set gill net (tan-paik)

There are different types of gill net used in study area. The specifications such as the mesh size, the length and height of the net and hanging ratio vary for different species.

Set gill net is also called Tan-paik is a submerged long net. It is 365m long and 3.5m wide. The head rope is buoyed up by 56 plastic floats and the ground rope is weighed with lead weights. This gear is used throughout the year. The target species is miscellaneous fishes.

Set gill net (wei-tar-paik)

This gear is used during November to April. Target species differed depending on the mesh size (15-30mm). The fish species like Notopterus notopterus, Catla catla, Mystus gulio, M. leucophasis, M. cavasius, Xenentodon cancila, Osteobrama belangeri, O. cunma, Mastacembelus armatus, Macrognathus aral, M. zebrinus are common species.

Drift gill net (sweh-paik)

This type of net has very long wings and a towing rope. The nets are of various lengths and come with or without collecting bags for catching and collection of fishes.
and are locally called Swei-paik. The size of the mesh depends upon the size of the fish to be caught.

Common target species were *Catla catla*, *Notopterus notopterus*, *Osteobrama belangeri*, *Aorichthys aor*, *Pama pama* and other large fishes.

The present work was commenced from December 2013 to February 2014. Kunnywa and Seikkanthaya villages are located the west of the Ayeyawady River, Pakokku Township in central dry zone of Myanmar. Kunnywa and Seikkanthaya are fishery Villages. Variety fishes were encountered and available throughout the study period.

A total of 45 species of fishes confined to seven orders, 21 families and 35 genera were identified and described. In this work, Siluriformes (16 species), Cypriniformes (11 species), Perciformes (10 species), Synbranchiformes (four species), Clupeiformes (two species), Osteoglossiformes (one species) and Beloniformes (one species) were recorded. Order Siluriformes is the largest order with seven families, followed by Cypriniformes and Perciformes.

In contrast, only a single species was represented under each of the order Osteoglossiformes and Beloniformes with the species included *Notopterus notopterus* and *Xenetodon cancila*.

Among the 45 species, *Notopterus notopterus*, *Wallago attu*, *Macrognathus aral*, *Bagarius bagarius*, *Hemipimelodus jatius*, *Clarias batrachus*, *Heteropneustes fossilis* and *Mystus cavasius* were common fishes recorded in this study site. The similar results are observed by Theingi Win (2007) who reported these fishes found in the Pakokku Market. She recorded to 42 species in this market.
Acantopsis choirorhynchos was observed in the present study. This specimen was not reported in the previous studies of Pakokku environs by Theingi Win (2007) and Myint Myint Win (2010) in their research.

The percentage of species composition was found to be highest (35.56%) under the order Siluriformes, followed by (24.44%) in each of Cypriformes, Perciformes, (22.22%), Synbranchiformes (8.89%), Clupeiformes (4.44%) and 2.22% in each of the remaining two orders Osteoglossiformes, Beloniformes (Figure 2).

According to recorded data, during the study period, number of species at Site I (31species) were lower than Site II (34 species). The highest total number species of fish were caught in Site II because this was situated at adjoining channel of Ayeyawady River.

The main commercial species are Hilsa ilisha, Catla catla, Aorichthys aor (Nga-gyaung), Acantopsis choirorhynchos, Wallago attu (Nga-but), Clarias batrachus (Nga-khu), Macrognathus aral (Nga-mway-ni-pyong), Notopterus notopterus (Nga-pheal), Channa orientalis (Nga-yant-gaungto), Masstacembelus armatus (Nga-mway-naga), Monopterus albus (Nga- shint), Mystus gulio (Nga-yway), Oreochromis sp, Channa orientalis and Channa panaw among the captured fishes. During the study period, these specimens were abundantly observed in this study site.

The above finding is in agreement with that of Kullandar et.al, (2004) describe that the Order Siluriformes is one of the largest orders with ten families. Among them, the family Bagridae consists of a diverse group of catfishes which are considered as most commercial important for food consumption and aquarium trade. Jayaram,
also stated that catfishes of the Family Bagridae are a popular sport fish and a valued food items inhabiting in freshwater.

The recorded catfish species were high economic value because of its good taste in fish meals. This finding is in accordance with that of Hung (2006).

Three types of fishing gear such as Set gill net (Tan-paik), Drift gill net (Swei-paik) and Gill net (Tar paik) were used in this study sites. (Of these, Set gill net and Drift gill net were commonly used in the whole year round. Fishermen employ bamboo screen and fixed traps at suitable points along the water ways of decreasing floodwaters. Because this type of fishing method is economically advantageous, it has been the most important fishing methods in the study sites. This finding coincides with the statement of FAO (2001).

According to the IUCN (International Union for Conservation of Nature, 2014 red list, two species of Data Deficient (*Hemipimelodus jatius, Anabas testudineus*) four species were Near Threatened (*Osteobrama belangeri, Wallago attu, Ompok pabo, Bagarius bagarius*) and 39 of the listed species are in the category of Least Concern species.

According to fish base, among the 45 species, 39 native species, one introduced species (*Oreochromis* spp), one species of questionable (*Gagata cenia*) and four species of endemic (*Gudusia varieta, Hilsa ilisha, Mystus leucophasis, Macrognathus*) were occurred in study area.

In Asia, 6106 organisms are threatened of which 688 are fin fishes. The Asia Silurid catfish *Wallago attu* (Nga-but) and *Osteobrama belangeri* (Nga-phan-ma) were endangered species. *Osteobrama cunma* (Nga-phant) was vulnerable species. Population is declining due to over-exploitation, pollution and destructive fishing
practices (Hossain et al., 2008, Lakra et al. 2010). These specimens were less found in this study site during the study period.

In the study sites, fishermen mainly use the traditional gears and specific fishing gears are employed depending on target fish (fish size). Fishermen had to use alternative gears or activities, nevertheless, in order to provide enough income to support their families.

From the findings of this study, it is concluded that, the freshwater fish being get from the inland capture fisheries provided not only daily diet but also livelihood of the majority of people living in this area.

Although the duration of study period was short, the information in this work is expected to be useful for further researcher
Table 1 List and status of fish species recorded at Kunnywa and Seikkanthaya Villages segment, Ayeyawady River

| Sr. No | Order                  | Family       | Species                                      | Common name                | Status (IUCN) | Status native/introduce |
|--------|------------------------|--------------|----------------------------------------------|----------------------------|---------------|-------------------------|
| 1      | Osteoglossiformes      | Notopteridae | *Notopterus notopterus* (Pallas, 1780)        | Grey feater back           | LC            | native                  |
| 2      | Clupeiformes           | Clupeidae    | *Gudusia variegata* (Day, 1870)              | Burmese River Shad         | LC            | endemic                 |
| 3      | Clupeiformes           | Clupeidae    | *Hilsa ilisha* (Hamilton-Buchanan, 1822)    | Toli shad                  | LC            | endemic                 |
| 4      | Cypriniformes          | Cyprinidae   | *Catla catla* (Hamilton-Buchanan, 1822)     | Catla                      | LC            | native                  |
| 5      | Cypriniformes          | *Labeo angra* (Hamilton-Buchanan, 1822)      | Angra labeo                 | LC            | native                  |
| 6      | Cypriniformes          | *Labeo calbasu* (Hamilton-Buchanan, 1822)   | Kalbasu, Black rohu        | LC            | native                  |
| 7      | Cypriniformes          | *Osteobrama belangeri* (Valenciennes, 1844) | Manipur osteobrama        | NT            | native                  |
| 8      | Cypriniformes          | *Osteobrama cumna* (Day, 1888)               | Cumna osteobrama           | LC            | native                  |
| 9      | Cypriniformes          | *Puntius chola* (Hamilton, 1822)             | Chola barb                  | LC            | native                  |
| 10     | Cypriniformes          | *Salmostoma sardinella*                     | sardinella razorbelly minnaw | LC            | native                  |
| 11     | Cypriniformes          | *Raipamas guttatus* (Day, 1780)              | Nga-la-wah                 | LC            | native                  |
| 12     | Cypriniformes          | *Acanthopsis choiorrhynchus* (Day)           | Banana fish                | LC            | native                  |
| 13     | Cypriniformes          | *Lepidocephus thermalis* (Valenciennes, 1846) | Malabar loach             | LC            | native                  |
| 14     | Cypriniformes          | *Aorichthys aor* (Hamilton, 1822)           | Giant river catfish        | LC            | native                  |
| 15     | Cypriniformes          | *Mystus gulio* (Hamilton, 1822)             | Long-whiskered catfish     | LC            | native                  |
| 16     | Cypriniformes          | *Mystus leucoplepis* (Blyth, 1860)          | Sittang mystus             | LC            | endemic                 |
| 17     | Cypriniformes          | *Mystus cavasius* (Hamilton, 1822)          | Gangetic mystus            | LC            | native                  |
| 18     | Cypriniformes          | *Mystus vittatus* (Roberts, 1992)           | Wynaad mystus              | LC            | native                  |
| 19     | Cypriniformes          | *Rita rita* (Hamilton, 1822)                | Rita                       | LC            | native                  |
| 20     | Siluriformes           | *Wallago attu* Day, 1877                     | Boal                       | NT            | endemic                 |
| 21     | Siluriformes           | *Ompok pabo* (Hamilton, 1822)               | Pabo catfish               | NT            | native                  |
| 22     | Siluriformes           | *Clupisoma prateri* Hora, 1938              | Burmese gana               | LC            | native                  |
| 23     | Siluriformes           | *Eutropiichthys vacha* (Hamilton, 1822)     | Batchwa vacha              | LC            | native                  |
| 24     | Siluriformes           | *Bagarius bagarius* (Hamilton, 1822)        | Gangetic goonch            | NT            | native                  |
| 25     | Siluriformes           | *Gagata gagata* (Hamilton-Buchanan, 1822)   | Gangetic gagata            | NT            | native                  |
| Sr. No. | Order           | Family            | Species                                      | Common name          | Status (IUCN) | Status native/introduce |
|--------|-----------------|-------------------|----------------------------------------------|----------------------|---------------|-------------------------|
| 28     | Clariidae       | Clarias batrachus | *Linnaeus, 1758*                            | Magur                | LC            | native                  |
| 29     | Ariidae         | Hemipimelodus jatus | *Hamilton, 1822*                           | River catfish        | DD            | native                  |
| 30     | Heteropeustidae | Heteropeustes fossils | *Bloch, 1794*                           | Stinging catfish     | LC            | native                  |
| 31     | Beloniformes    | Belonidae         | Xenetodon cancila | *Hamilton, 1822* | LC            | native                  |
| 32     | Synbranchiformes | Synbranchidae    | Monopterus albus | *Zuiew, 1793* | LC            | native                  |
| 33     | Mastacembelidae | Mastacembelus armatus | *Lacepede, 1800*                  | Rice swampeel        | LC            | native                  |
| 34     |              | Macrognathus aral | *Bloch & Schneider, 1801* | One-stripe spinyeel  | LC            | native                  |
| 35     |              | Macrognathus zebrinus | *Blyth, 1859*                  | Burmese spinyeel     | LC            | endemic                 |
| 36     | Perciformes     | Glossogobius giuris |                                      | Tonk boby            | LC            | native                  |
| 37     | Gobiidae        | Channa orientalis | *Bloch & Schneider, 1800* | Asiatic snakehead   | LC            | native                  |
| 38     | Channidae       | Channa panaw      |                                             | Spotted snake head   | LC            | native                  |
| 39     | Mugilidae       | Rhinomugil corsula | *Musikasinthorn, 1998* | Corsula mullet       | LC            | native                  |
| 40     | Sciaenidae      | Pana pama         | *Hamilton, 1822*                           | Pana                 | LC            | native                  |
| 41     | Anabantiidae    | Anabas testudineus | *Bloch*                         | Climbing perch       | DD            | native                  |
| 42     | Ambassidae      | Pseudambassis ranga | *Hamilton, 1822*                  | Indian glassy fish   | LC            | native                  |
| 43     |              | Pseudambassis lala | *Hamilton, 1822*                  | Indian glassy fish   | LC            | native                  |
| 44     | Cichlidae       | Orechromis sp | Gunther, 1889                           | Tilapia              | LC            | introduce               |
| 45     | Sciaenidae      | Otolithoides biauritus | *Cantor, 1850*            | Bronze croaker       | DD            | native                  |

LC - Least concern, NT - nearly threaten, DD - Data deficient.
4. Conclusion

It concluded that, these Sites are productive and successfully providing the basic need of the local inhabitants and a livelihood to those who are working on the villages. Therefore, the two villages play a major role of fishery worksites. Two species of data deficient, four species were near threatened and 39 of the listed species are in the category of least concern species. Among the 45 species, 39 native species, one introduced species (*Oreochromis* spp), one species of questionable (*Gagata cenia*) and four species of endemic (*Gudusia varieta, Hilsa ilisha, Mystus leucophasis, Macrognathus*) were recorded.

Acknowledgements

I want to express my gratitude to Department of Higher Education, Ministry for providing grant for this research paper. I am grateful to Dr. Win Swe, Rector and Professor Dr. Khin Than Htay, Head of Department of Zoology, Shwebo University for their encouragement. Same ways, I am also thanks to Associate Professor Dr. Sukree Hajisamae, Dean and Chairperson of the Organizing Committee, Prince of Songkla University for his available help.

References

Axelord, H.R and Schultz, L.P., 1995. *Hand book of Tropical Aquarium fishes.* Published by the McGrow-Hill Book Company, Inc. New York, Totonto, London.

Day, F., 1878. *The fishes of India being a natural history of the fishes known to inhabit the sea and freshwater of India, Burma and Ceylon.* Vol. I & II. Taylor and Tomorrows Book Agency, New Delhi. pp. 1878.
Day, F., 1889. *The fauna of British India including Ceylon and Burma fishes*. Vol. I &II Taylor and Francis, London, England. pp. 816.

Department of fisheries / Myanmar, 2008. *Commercial fishes of Myanmar* Department of fisheries Yangon, Myanmar.

FAO, 2009. *Fisheries latest Data* Green facts food and Agriculture Organization of the United Nation.

Hossain, M.Y., Ahmed, Z.F., Ohtomi, J., Ibrahim, A.H.M., EL-kady, M.A.H., Fulanda, B. and Chakraborty, S.K., 2008. Threatened fishes of the world: *Wallago attu* (Bloch and Schneider, 1801) (Siluriformes: Siluridae), *Environ. Biological fish*, 82:277.

Hung, L.H., 2006. Aquaculture system in HCM city, *Sustainable Development of Peri-urban in South-east Asia (Susper) Project*, Asian Vegetable Research and Development Center.

IUCN, 2014. The IUCN Red List of Threatened Species. Retrieved from: http://www.iucnredlist.org.

Jayaram, K.C., 2010. *The freshwater fishes of India region* Zoological Survey of India, Delhi.

Khin Maung Soe, 2008. Trends of Development of Myanmar Fisheries: With References to Japanese Experiences. Institute of Developing Economic Japan *External Trade Organization* 433: 40 pp.
Kullandar, S.O., Fang, F., and Ferraric, Jr.C.J., 2004. The fresh water fishes of Myanmar. Swedish Museum of Natural History (NRM). *Fish Research Project.*

Lagler, K.F., Bardach, J.E and Miller R.R., 1962. *Ichthyology: The Study of Fishes,* John Wiley and Sons Inc., Toppon Printing Co., Ltd, Tokyo, Japan.

Lakra, W.S., Sarkar, U.K., Gopalakrishnan, A and Kathirvelpandian, Sh.A., 2010. *Threatened Freshwater Fishes of India,* National Bureau of Fish Genetic Resources, Lucknow (Indian Council of Agricultural Research).

Lowe-McConnel, R.H., 1989. *Ecological studies in tropical fish communities* Cambridge University Press Cambridge.

Myint Myint Win, 2010. *Seasonal occurrence of freshwater fishes and the yield in Bodagon In (lake), a segment of Ayeyarwady river in Pakokku Township* (Doctoral thesis), Department of Zoology, University of Mandalay.

Nelson, J.S., 1984. *Fishes of the World.* John Wiley and Sons, New York.

Sandar Maung, 2004. *Taxonomic study of some bony fishes of Man-Chaung, Sagu Township Area, Magway Division.* (MRes Thesis), Department of Zoology, University of Mandalay.

Talwar, P.K and Jhingran, A.G 1991. *Inland fishes of India and Adjacent countries* Oxford and IBH Publishing Co. PVT. Ltd, Calcutta.

Theingi Win, 2007. *Taxonomic study of some freshwater fishes from Pakokku, Market* (MRes., Thesis), Department of Zoology, Pakokku University.
United Nations Environmental Programme, 2002. *Convention on biological Diversity*.

Welcomme, R.L., 1985. River Fishes *FAO Fishes Technical Paper*. 262330pp.

Welcomme, R.L., 2001. Inland fisheries.Ecology and management. *Food and agriculture organization of the United Nations*, Rome pp.188.