Agricultural and Biological Sciences Journal
Vol. 7, No. 4, 2021, pp. 136-150
http://www.aiscience.org/journal/absj
ISSN: 2381-7178 (Print); ISSN: 2381-7186 (Online)

Systematic Study on Some Fishes in Moe Yun Gyi Wetland Environs

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Abstract

Fish samples were collected from three different sites; site A (entrance of Moe Yun Gyi Wetland), site B (Tar zone) and site. Moe Yun Gyi Wetland is the vital resource of fish products for villagers near its surrounding. Moe Yun Gyi is a widely research areas for researchers and students of Myanmar to study ecosystem of environment concerning animals and plants. In this paper, fish species of Moe Yun Gyi wetland were focused. Simple method was used in this work such as collecting the fishes by fishing gears and identification with the method of Tawlar and Jhingran in 1991. Fish species were photographed with digital camera (Samsung Digimax A 402). Identification was based on the characters, coloration, fin and scale count, and measurements. A total of 22 species under 17 genera of 13 families belonging to five orders were recorded. In all study sites the composition of recorded fish species were found to be the highest in the order Siluriformes (38%), order Cypriniformes (15%), Perciformes (31%) and remaining two orders: Osteoglossiformes and Cyprinodontiformes (each with 8%). Monthly occurrence of recorded fish was the highest in November, 2020. These percentage were in November (24%), in January (22.5%), in December (16.9%) and remaining months, October and February (each with 18%). Order Siluriformes and Perciformes were most common in the study area. The objectives of this study are to identify the some fish species in Moe Yun Gyi Wetland Wildlife Sanctuary and to investigate the morphometric characters of some fishes in Moe Yun Gyi wetland area.

Keywords

Fishes, Siluriformes, Cypriniformes, Wetland, Penciformes, Osteglossiformes

Received: September 28, 2021 / Accepted: November 23, 2021 / Published online: December 6, 2021

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1. Introduction

Fishes are the most ancient and diverse vertebrates and out of the 49,900 extant vertebrate species in the world 21,723 are fish. Among these, 8411 are freshwater and 11,650 are marine species. The freshwater fish mostly live in the vast river systems and takes of the tropics [1-12]. Marshes, swamps, and bogs have been well-known terms for centuries, but only relatively recently have attempts been made to group these landscape units under the single term "wetlands." This general term has grown out of a need to understand and describe the characteristics [40] and values

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of all types of land, and to wisely and effectively manage wetland ecosystems. The term wetland includes a variety of areas that fall into one of five categories: (1) areas with hydrophytes and hydric soils, such as those commonly known as marshes, swamps, and bogs; (2) areas without hydrophytes but with hydric soils – for example, flats where drastic fluctuation in water level, wave action, turbidity, or high concentration of salts may prevent the growth of hydrophytes; (3) areas with hydrophytes but nonhydric soils, such as margins of impoundments or excavations where hydrophytes have become established but hydric soils have not yet develop; (4) areas without soils but with hydrophytes such as the seaweed-covered portion of rocky shores; and (5) wetland without soil [38] and without hydrophytes, such as gravel beaches or rocky shores without vegetation. Wetlands have been shown to provide a variety of ecological, biological, and hydrologic functions that provide economic, aesthetic, recreational, educational, and [54] other values to society [4, 14-16, 21, 28, 29, 31].

Moe Yun Gyi Wetland Wildlife Sanctaury is one of the 99 wetland sites in Myanmar which is located in the Bago Region, at the junction of Bago and Waw Townships. It remains as a reservoir for the Bago-Sitaung cannels since 1876. Over a century of time, the wetland is source of freshwater body. In the vicinity of Moe Yun Gyi Wetland Wildlife Sanctaury, people of 17 villages are depending on wetland for their livelihood. Majority earn from fishery, some by agriculture and some by livestock breeding. Moe Yun Gyi wetland is the first Ramsar site in Myanmar. It has been identified as one of the 19 sites qualified for Global Conservation Significance according to various Criteria [17-20, 24, 30]. The Ramsar definition on wetlands is the most widely used [32] and defines as areas of marsh, fen, peat land or water; whether natural or artificial, permanent or temporary with water that is static or flowing, fresh, brackish or salty including areas of marine water, the depth of which at low tides does not exceed six meters. They may therefore, range from permanent or seasonal lakes, seasonally waterlogged soils and estuarine systems to marine systems. This definition basically covers natural, artificial and marine wetlands as long as the depth does not exceed six meters at low tide. Whereas the Ramsar emphasizes [37] on wetlands in regards to their importance as waterfowl habitats [1].

Sound systematic data are important for conservation. Without accurate taxonomy, it is impossible to identify the species and evaluate their conservation status, it is impossible to properly manage their fisheries, it is impossible to evaluate the conservation value of habitats or [41] areas, it is impossible to establish strategies and it is impossible to set priorities [22, 23, 13]. Myanmar is considered to have some of richest inland fisheries resources in the world [35]. The utilization of fisheries resources increases year by year to support the need for food. Quality of fishing gear used for harvesting of the resources is one of the most important factors for fisheries development [59]. If it was used without a sense of resource conservation it will also be the means of destroying the resources [24-27]. The Moe Yun Gyi wetland is recent interesting place of other wetlands in Myanmar. The findings of this work after meeting the mentioned objectives could serves as further information to later research workers interested in the fields of ichthyology. The aim and objectives of this study are: to identify the some fish species in Moe Yun Gyi Wetland Wildlife Sanctuary and to investigate the morphometric characters of some fishes in this study area [69].

2. Materials and Methods

2.1. Study Area and Site

The present study was chosen in Moe Yun Gyi Wetland Wildlife Sanctuary. It is located in Pyinbongyi village, the southern part of Bago Region, the western and southwestern parts belong to Bago Township and sourthern and eastern parts to Waw Township. The distance is 112 Kilometers (71 miles) north of Yangon. It lies between 17° 30′ and 17° 36′ North latitudes and between 95° 33′ and 96° 39′ East longitudes. The northern boundary demarcated between the wetland and Daik-Oo Township. The area is 103.60 square kilometer or 103599.52 hectares with 10 meters above sea level. The study area consists of three study sites, site A (entrance of Moe Yun Gyi Wetland) N 17° 34.023′ and E 096° 34.466′, site B (Tar zone) N 17° 35.3.3′ and E 096° 35.666′ and site C (Pyinbongyi morning market) N 17° 35.015′ and E 096° 35.352′ near the Moe Yun Gyi Wetland Wildlife Sanctuary (Figure 1).

2.2. Study Period

The present study was carried out from October, 2020 to March 2021.

2.3. Collection of Specimens

The fishes were collected by various fishing gears from study area. The small fishes were preserved in five percent formalin contained in plastic bottles. The large fishes were preserved in ten percent formalin kept in plastic containers. Before preserve the fresh specimen recorded by digital camera. Local names of the studied species were interviewed from the local people and fishermen in this study area. This specimen were counted fin rays, spines and scales and identified at the laboratory of Zoology Department in Bago University.

2.4. Identification for Specimens

These specimens were identified according to Tawlar and Jhingran in 1991.

Figure 1. Satellite map of study area and study sites of Moe Yun Gyi Wetland Wildlife Sanctuary (Sources: Google earth map).

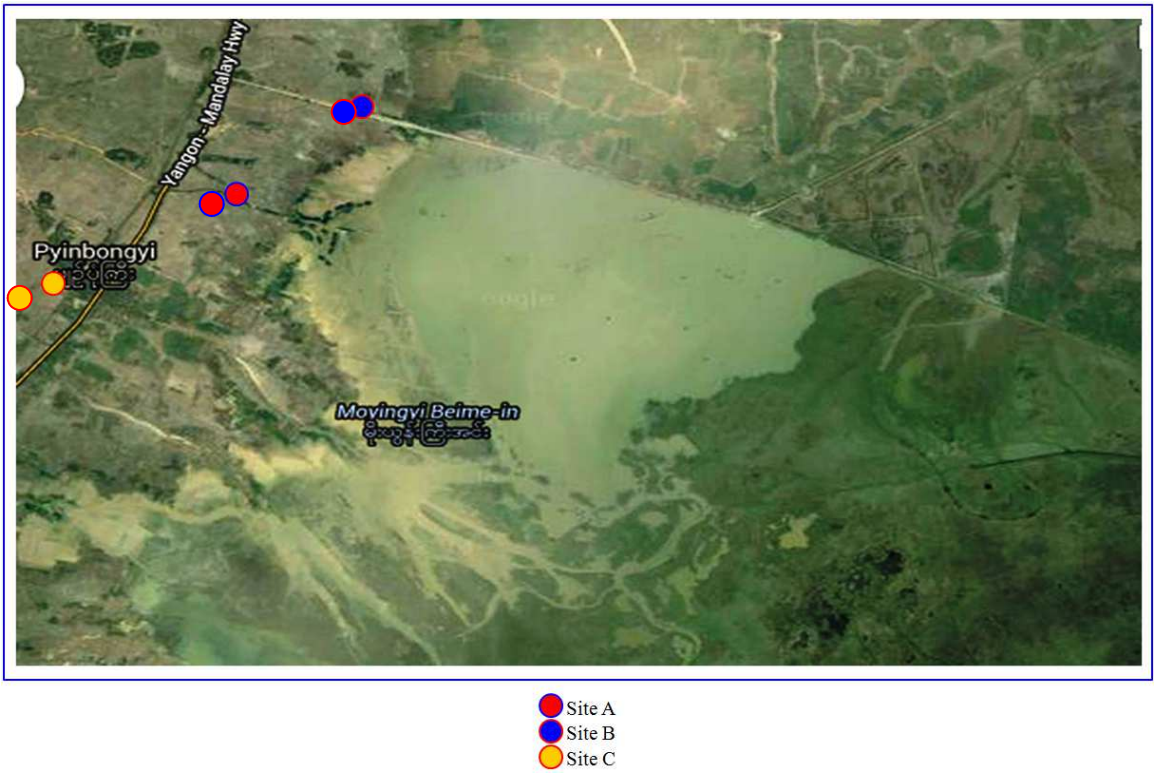


Figure 1. Study sites.

3. Results

3.1. Systematic Position of Recorded Species

A total of 22 fish species from 17 genera, 13 families and five orders were recorded from three study sites (A, B and C) [64]. The systematic position of recorded species from Moe Yun Gyi Wetland was based on Tawlar and Jhingran in 1991.

Notopterus notopterus (Pallas, 1769) (Figure 2-A)

Common Names: Grey featherback

Local Name: Nga-phe/ Nga-lar

Fin Formula: B VIII; D 7-9; P 15-17; V 5-6; A+C 100-110; L.l 180; L.tr 15/50

Diagnostic characters

Head: Compressed, its length about 4.5 times in standard length; preorbital serrated [34]. Eyes large, dorsolateral in position. No barbels.

Mouth: Wide, maxilla extends to midorbit.

Body: Oblong, deep and strongly compressed. Abdomen serrated before pelvic fins, with [33] about 28 scutes. Caudal region very long and tapering.

Fins: Small dorsal fin inserted nearer snout-tip than to base of caudal fin. Anal fin long-based and narrow, confluent with a reduced caudal fin [55]. Pelvic fins rudimentary. Pectoral fins moderate, inserted low on body [51] and extend beyond anal fin origin.

Scales: Cycloid; minute, considerably larger on opercles than on body [34].

Lateral line: Complete.

Color: Silvery-white with or without numerous fine grey spots on body and head which are dark along the narrow back [34].

3.2. *Osteobrama belangeri* (Valenciennes, 1844) (Figure 2-B)

Common Names: Manipur osteobrama

Local Name: Nga-phane-ma

Fin Formula: B III; D iii-iv 8; P i 16; V 8; A iii 17-18; C 19; L.l 55-70; L.tr 9/15 [33]

Diagnostic characters

Head: Small, compressed; barbels absent. Eyes large, often visible from underside of head.

Mouth: Small, somewhat directed upwards and forwards; lips thin, lower lip adnate to lower jaw [33].

Body: Trapezoid and considerably compressed, its depth 1.6 to 2.1 times in standard length; entire abdominal edge sharp and keeled. Predorsal scales 31 to 34 [34].

Fins: Dorsal fin inserted considerably behind vertical from pelvic fin base, generally extending over long anal fin [45]. Dorsal spine strong and serrated.

Scales: Small cycloid.

Lateral line: Complete [45].

Color: Silvery, the back grayish; often banded in young.

3.3. *Osteobrama cotio cunma* (Day, 1878) (Figure 2-C)

Common Names: Cunma osteobrama

Local Name: Nga-lay-pyar

Fin Formula: B iii; D iii 9; P i 12; V i 9; A iii 25-29; C 15; L.l 55-60; L.tr 9/15 [33]

Diagnostic characters

Head: Small compressed; eyes large often visible from undersides of head.

Mouth: Small; barbells absent [33].

Body: Trapezoid and considerably compressed, its depth 2.1 to 3.1 times in standard length; abdominal edge trenchant from behind base of pelvic fins to anal fin, but rounded in front of pelvic fins [47].

Fins: Dorsal spine weak and minutely serrated along its posterior edge.

Scales: Small, cycloid [49].

Lateral line: Complete.

Color: Silvery-olive, darkest on back, with a brassy tinge along the lateral line and over cheeks and operculum. Fins grayish; dorsal and caudal fins with narrow dusky edges [33].

3.4. *Puntius chola* (Hamilton-Buchanan, 1822) (Figure 2-D)

Common Names: Swamp barb, Chola barb

Local Name: Nga-khone-ma

Fin Formula: B III; D iii 8; P i 14; V i 8; A ii 25-29; C 19; L.l 20-47; L.tr 5/4 [33]

Diagnostic characters

Head: Short, snout often overhanging mouth.

Mouth: Moderate; barbels one short maxillary pair.

Body: Body fairly deep and compressed, its lower profile considerably less convex than upper, its depth 2.8 to 3.1 times in standard length [34].

Fins: Dorsal fin inserted equidistant between snout-tip and base of caudal fin; its last unbranched ray osseous, fairly strong and smooth.

Scales: Moderate

Lateral line: Complete [34]

Color: Uniform silky silvery with a strong olive-green on back and a delicate yellowish-sheen on flanks, underside pale; a large blurred-edged, rosy spot/blotch on operculum, and often a black blotch behind gill-cover; a deep black blotch, often framed in gold, near base of caudal-fin; eyes iridescent orange-red [35]. Dorsal fin yellow to orange, often with brown spots in older individuals; other fins delicate yellowish. Male have orange tinged pelvic and anal fins.

3.5. *Puntius sophore* (Hamilton-Buchanan, 1822) (Figure 2-E)

Common Names: Spotfin swamp barb

Local Name: Nga-khone-ma

Fin Formula: B III; D iii-iv 8-9; P i 14-16; V i 8; A iii 5; C 19; L.l 24; L.tr 6/3 [36]

Diagnostic characters

Head: Short, its length 3.8 to 4.1 times in standard length.

Mouth: Terminal; no barbells.

Body: Body relatively deep, its dorsal profile more convex than ventral [34], its depth 2.7 to 3 times in standard length.

Fins: Dorsal fin inserted equidistant between tip of snout and base of caudal fin; its last unbranched ray osseous and smooth [36].

Scales: Cycloid

Lateral line: Complete.

Color: Beautiful silvery, back grey-green to brownish; [34] flanks with a somewhat bluish luster, underside white; a deep black round blotch at base of caudal fin, a similar black blotch on central part of dorsal fin or also on anterior part of body adjacent to dorsal fin. Fins hyaline in mature females; anal and pelvic fins brick red in mature males.

3.6. *Amblypharyngodon mola* (Hamilton-Buchanan, 1822) (Figure 2-F)

Common Names: Mola carplet, Pale carplet

Local Name: Nga-bel-phyu

Fin Formula: B III; D ii-iii 7; P i 13-15; V i 8; A ii-iii 5-6; C 19; L.l 65-75; L.tr 12/12 [36]

Diagnostic characters

Head: Well compressed, eyes large, slightly visible from underside of head.

Mouth: Moderate, somewhat superior, lower jaw fairly prominent with a thin sharp edge, no barbels [33].

Body: Elongate, its depth 3.5 to 3.8 times in standard length. Abdomen rounded [34].

Fins: Dorsal fin inserted slightly behind pelvic fin base, its simple rays nonosseous, anal fin short-based.

Scales: Small, cycloid

Lateral line: Incomplete

Color: Golden yellow with a broad silvery lateral band on body. Dorsal, anal and caudal fins usually with dark markings; pectoral and pelvic fins hyaline [35].

3.7. *Lepidocephalus berdmorei* (Blyth, 1861) (Figure 3-A)

Common Names: Burmese loach

Local Name: Nga-tha-lae-doh

Fin Formula: B III; D ii-iii 6; P i 7-9; V i 7; A ii 5-6; C 17 [36]

Diagnostic characters

Head: Eyes small, covered with transparent skin. Suborbital spine long, slightly curved.

Mouth: Inferior; barbels three pairs; mental lobe produced posteriorly into three or more short barbell-like projections [35].

Body: Elongate, low, slightly compressed anteriorly and strongly posteriorly, its depth 7 to 7.7 times in total length [34].

Fins: Dorsal fin inserted behind pelvic fin base, much nearer to caudal fin base than snout-tip. Caudal fin emarginated [36].

Scales: Very small, cycloid [36].

Lateral line: Absent.

Color: Pale reddish-clay, thickly freckled over with blackish markings except on belly; about 12 large black spots along the flanks; head minutely speckled. Dorsal and caudal fins speckled, anal fin less so; paired fins with dark centres.

3.8. *Mystus bleekeri* (Day, 1877) (Figure 3-B)

Common Names: Day's mystus

Local Name: Nga-zin-yine –mekwet [35]

Fin Formula: B X; D I 7-8; P I 9-10; V i 5; A iii 6-7; C 17; L.l 55-70; L.tr 9/15

Diagnostic characters

Head: Depressed; occipital process twice as long as broad at its base [33], extends to basal bone of dorsal fin; median longitudinal groove shallow, reaching to base of occipital process. Eye-diameter 4 to 4.5 times in head, about 14.5 times in interorbial width.

Mouth: Terminal; teeth villiform in bands on jaws, vomerine patch crescentic and continuous. Barbels four pairs; maxillary barbells extend posteiorly to anal fin.

Body: Elongate and compressed, its depth 3.8 to 4.3 times in standard length [34].

Fins: Dorsal fin smooth, rarely finely serrated; adipose fin large, inserted just behind rayed dorsal fin, its base about 2.4 times in rayed dorsal fin base. Caudal fin forked [33]; least height of caudal peduncle about 2 times its height [34].

Scales: Absent [34].

Lateral line: Complete

Colour: Brownish above, lighter below, with two light longitudinal bands, one above and the other below lateral line; often with a dark shoulder spot. Fins grayish-white, darkest at their edges [33].

3.9. *Mystus cavasius* (Hamilton-Buchanan, 1822) (Figure 3-C)

Common Names: Gangetic mystus

Local Name: Nga-zin-yaing

Fin Formula: B VI; D I 7; P I 8; V i 5; A iv 7-9; C 16 [36]

Diagnostic characters

Head: Conical; occipital process narrow, 3.5 to 4 times [60] as long as broad, extends to basal bone of dorsal fin; median longitudinal groove on head extends to base of occipital process. Barbels four pairs; maxillary barbels extend posteriorly to beyond caudal fin base [35].

Mouth: Terminal, arc-shaped.

Body: Elongate and compressed posteriorly, its depth 4 to 4.5 times in standard length [34].

Fins: Dorsal spine weak, often feebly serrated; adipose fin large, inserted close behind with base of rays dorsal fin. Caudal fin deeply forked; least height of caudal peduncle about 1.4 times its length.

Scales: Absent.

Lateral line: Complete.

Color: Greyish with a more or less well-defined midlateral longitudinal stripe, often also a less well-defined or more diffuse longitudinal stripe ventral to the midlateral stripe, a dark humeral spot emphasised by a white or pale area along its ventral margin. Dorsal and caudal fins dusky; paired fins and anal fin dull white.

3.10. *Mystus menoda* (Hamilton-Buchanan, 1822) (Figure 3-D)

Common Names: Menoda catfish

Local Name: Nga-eike

Fin Formula: B X; D I 7; P I 9; V i 5; A iii-v 8; C 17

Diagnostic characters

Head: Depressed; occipital process long, about 5 times as long as broad at its base, not extending to basal bone of dorsal fin; median longitudinal groove on head extends to base of occipital process. Eye small [33], its diameter 6.8 to 8 times in head, 2.5 to 3 in interobital width.

Mouth: Terminal; teeth villiform in bands on jaws; vomerine tooth-band continuous and crescentic. Barbels four pairs; maxillary [34] barbells extend posteriorly to anal fin. Dorsal spine serrated on its inner edge [56].

Body: Elongate and compressed, its depth 4.4 to 6.2 times in standard length [34].

Fins: Adipose fin considerably behind dorsal fin. Caudal fin forked, its upper lobe longer and often with a prolongation; least height of caudal [33] peduncle about 2 times in its length [51].

Scales: Absent.

Lateral line: Complete.

Color: Greyish-brown above, dull white below; a row of clusters of very small spots along anterior part of lateral line. Fins grayish, with dusky tips; a reddish semicircular band on caudal fin [33].

3.11. *Ompok bimaculatus* (Bloch, 1797) (Figure 3-E)

Common Names: Indian Butter-catfish

Local Name: Nga-nu-than

Fin Formula: B XIII; D 4; P I 12-14; V i 7-8; A ii-iii 57-58; C 17 [36]

Diagnostic characters

Head: Depressed; nostrils fairly close to each other, anterior nostrils tubular, posterior pair valved. Eyes subcutaneous, its lower border below level of cleft of mouth [33], visible from underside of heads. Barbels two pairs; maxillary barbells long and extend to or slightly beyond anal fin origin, the mandibular pair very short [34].

Mouth: Large, oblique, its gape not reaching anterior margin of eye; lower jaw longer than the upper [33].

Body: elongate and strongly compressed.

Fins: Dorsal fin short. Anal fin long, inserted well behind dorsal fin [34]. Anal fin long, inserted well behind dorsal fin. Pectoral spine moderately strong, feebly serrated on its inner edge. Caudal fin deeply forked, with pointed lobes.

Scales: Absent.

Lateral line: Complete [33].

Color: Silvery short with purple, dorsally dark grey-green to brownish with a tinge of golden yellow [35]; a large dusky on shoulder on lateral line; a small black spot on caudal peduncle just above lateral line; often a dark transverse bar across base of caudal fin. Fins pale golden. Young fishes transverse as glass.

3.12. *Wallago attu* (Schneider, 1801) (Figure 3-F)

Common Names: Boal

Local Name: Nga-bat

Fin Formula: B XIX-XXI; D 5; P I 13-15; V i 7-9; A iii 74-93; C 17 [36]

Diagnostic characters

Head: Eyes small. Large, depressed

Mouth: Wide, its gape extends posteriorly to beyond eyes. Barbels two pairs; maxillary pair long, extend posteriorly to well beyond origin of anal fin, the mandibular pair much shorter, about as long as snout [35].

Body: Elongated and compressed. Abdomen rounded [45].

Fins: Dorsal fin short, inserted usually slightly in advance of pelvic fins [36]. Pectoral spine weak, often poorly serrated on its inner edge. Caudal fin deeply forked, its upper lobe longer.

Scales: Absent

Lateral line: Complete [33]

Color: Rather uniform silvery, may be olive with golden gloss above, with sides of body dull white; a faint orange-yellow band along lateral line often present. Anal and caudal fins somewhat dusky [46].

3.13. *Pseudeutropius atherinoides* (Blyth, 1861) (Figure 4-A)

Common Names: Indian potasi

Local Name: Nga-than-chate

Fin Formula: B IV; D I 5-6; P I 7; V i 5; A iii 30-43; C 17 [36]

Diagnostic characters

Head: Tapering, conical to slightly compress. Eyes large lateral or ventrolaterally directed [43]. Barbels four well-developed pairs, the maxillary pair extend to anal fin [34].

Mouth: Terminal and moderadely wide, its cleft not extending to anterior border of eye [33].

Body: Elongate and laterally compressed.

Fins: Dorsal fin inserted anterior to pelvic fins. Anal fin placed about half eye-diameter behind dorsal fin. Pectoral spine extends backwards beyound base of dorsal spine [34]. Caudal fin deeply forked.

Scales: Absent

Lateral line: Complete

Color: Silvery-greenish on back; 3 or 4 longitudinal bands on flank [58]; a pale golden stripe along lateral line ending in a dusky spot at base of caudal fin; occasionally the bands may be wanting; usually a black spot at nape and in front of dorsal fin [44]; area above pectoral fins translucent.

3.14. *Clarias batrachus* (Linnaeus, 1758) (Figure 4-B)

Common Names: Walking Catfish, Magur

Local Name: Nga-khu

Fin Formula: B IX; D 70; P 19; V I 5; A 51; C 10

Diagnostic characters

Head: Broad and moderately depressed, its length about 2 times in its width [58], covered with osseous plates dorsally and laterally [68]; occipital process angular and narrow, its distance from dorsal fin base 4.5 to 6 times in head length; eyes small not visible from underside of head; nostrils widely separated; anterior nostrils tubular behind upper lip, posterior nostrils rounded slits behind nasal barbels. Barbels four pairs; the maxillary pair extends considerably beyond base of pectoral fin [33].

Mouth: Terminal and transverse; upper jaw a little projecting.

Body: Cylindrical and elongate, and compressed posteriorly.

Fins: Dorsal fin and anal fin very long [56]. Dorsal fin inserted slightly anterior to tip of pectoral fins. Pectoral spine strong, finely serrated on both edges, often rough externally [35]. Caudal fin rounded.

Scales: Absent.

Lateral line: Complete [55].

Color: Brownish to green-blue in life and flanks and belly pale brown to delicate reddish [33]. Small white specks are present on the back half of the body [44]. Dorsal and anal fins usually with red margins, the dorsal fin more yellow-green [33].

3.15. *Heteropneustes fossilis* (Bloch, 1794) (Figure 4-C)

Common Names: Stinging catfish [63]

Local Name: Nga-gyee

Fin Formula: B VII; D 6-7; P I 7; V i 5; A 60-70; C 19 [36]

Diagnostic characters

Head: Flat and greatly depressed, its dorsal and lateral parts covered with osseous plates. Occipital process not extending to base of dorsal fin. Barbels four well-developed pairs (nasal, maxillary and two mandibular pairs). Nostril widely separated [33].

Mouth: Mouth small, terminal and transverse.

Body: Elongate, subcylindrical to pelvic fin base, compressed behind.

Fins: Dorsal fin short-based, inserted usually above tip of pectoral fins. Pectoral fin with a strong spine, serrated along its inner edge and with a few serrations at it anterior end externally [43], about two-thirds as long as head. Anal fin long-based, separated by a distinct notch from caudal fin.

Scales: Absent.

Lateral line: Complete.

Color: Yellow or leaden or dark purplish-brown above, lighter below, usually with two lateral yellowish bands. Young reddish [35].

3.16. *Xenentodon cancila* (Hamilton-Buchanan, 1822) (Figure 4-D)

Common Names: Freshwater garfish

Local Name: Nga-phaung-yoe

Fin Formula: B X; D 15-18; P 11; V 6; A iii 16-18; C 15; L.l 46-48 [36]

Diagnostic characters

Head: Relatively small. Eyes rather small. Cheeks long; operculum 1.7 to 2 times in cheek [34].

Mouth: Both upper and lower jaws extended into long beaks armed with sharp teeth to their tip. Nasal organ a pit with protruding tentacle [33].

Body: Very elongate and slightly compressed.

Fins: No spines in fins. Doral and anal fins on rear half of body [62], dorsal fin inserted usually anterior to vertical through origin of anal fin. Pelvic fins abdominal. Caudal fin truncate.

Scales: Thin cycloid.

Lateral line: Complete, running along ventral edge of the body [49].

Color: Greenish above, flanks green-silvery, fading to whitish below; a silvery lateral band (with a dark margin) extend on flank of body [34]; a series of four or five blotches (absent in young) on sides of body between pectoral and anal fins. Dorsal and anal fins dark-edged.

3.17. *Pseudambasis ranga* (Hamilton-Buchanan, 1822) (Figure 4-E)

Common Names: Indian glassy fish

Local Name: Nga-zin-zat

Fin Formula: B VI; D VII+I 11-14; P I 11-12; V 15; A III 13-15; C 17 [33]

Diagnostic characters

Head: Short, compressed, snout pointed.

Mouth: Oblique. Gillrakers 15 or 16 on lower arm of first arch.

Body: Stout, deep and compressed. Preopercular hind edge smooth, atmost with one or two serrations at angle [34].

Fins: Hyaline; dorsal and caudal fins with blackish edges [35].

Scales: Thin and cycloid

Lateral line: Complete

Color: Transparent with a greenish-yellow tinge and a silvery gloss on dorsum; a silvery broad lateral stripe on side of body; a definite dusky spot on shoulder [34].

3.18. *Anabas testudineus* (Bloch, 1785) (Figure 4-F)

Common Names: Climbing perch

Local Name: Nga-pyay-ma

Fin Formula: B VI; D XVI-XVIII 8-10; P i 13-14; V 15; A VIII-XI 9-11; C 17; L.l 29-32; L.tr 4/10 [36]

Diagnostic characters

Head: Broad and hard; preorbital strongly denticulated. Opercle, subopercle and interopercles are strongly spinate which helps in the walking movement of the fish.

Mouth: Fairly large and terminal; upper jaws only slightly protrusible.

Body: Oblong, compressed and moderately deep, its depth 3 to 3.5 times in standard length; head [34] and anterior part of body rather broad, posterior part compressed.

Fin: Dorsal and [34] anal fins with spines; pelvic fins thoracic; dorsal fin inserted over or slightly in advance of pectoral fins; Pectoral fins bluntly rounded; Pelvic fins inserted slightly behind pectoral fins. Caudal fin rounded.

Scales: Ctenoid.

Lateral line: Interrupted or two lateral lines, lower one commencing below end of upper line and separated from it by a series of scales [33].

Color: Adults greenish to dark grey on dorsal side and flanks, fading to pale yellow on belly; often with four vertical bands on flanks in juveniles; a distinct dark spot at base of caudal fin, often fades with age; usually a black spot at base of pectoral fin. Dorsal and caudal fins dark grey; pectoral and anal fins pale yellow; and pelvic fins pale orange.

3.19. *Colisa labiosus* (Day, 1876) (Figure 5-A)

Common Names: Thick-lipped Gourami

Local Name: Nga-pyin-tha-let

Fin Formula: B V; D XV-XVIII 8-10; P 10; V I; A XVI-XVIII 17-20; C 167; L.l 30; L.tr 5/12

Diagnostic characters

Head: Moderate, compressed. Snout blunt. Eyes large.

Mouth: Small and highly protrusile; lips very thick and papillose, especially in males. Preorbital denticulate.

Body: Oblong and compressed.

Fins: Soft dorsal fin pointed, 3rd to 5th rays elongate; soft anal fin fairly elongate. Caudal fin truncate.

Scales: Ctenoid

Lateral line: Absent

Color: Greenish with some indistinct orange-brown irregular dark bars and light blue-green vertical markings on flanks; often with a blue horizontal stripe [35]. Fins dark; outer edge of anal fin yellowish-red [45].

3.20. *Trichogaster pectoralis* (Regan, 1909) (Figure 5-B)

Common Names: Snakeskin Gourami

Local Name: Mwe-mu-yay

Fin Formula: B V; D VII 10-11; P 10; V I; A IX-XII 33-38; C 17; L.tr 10/16

Diagnostic characters

Head: Short, compressed. Snout blunt. Eyes moderate.

Mouth: Superior, slightly protrusible.

Body: Body moderately elongate and compressed.

Fins: Soft dorsal fin in adult males, when flexed, extends beyond base of caudal fin; in females [45] falls short of caudal fin. Anal fin almost confluent with caudal fin. First pelvic ray elongate and filamentous, reaching to end of caudal fin.

Scales: Ctenoid

Lateral line: Complete, but not continuous.

Color: Pale grey to olive green with numerous oblique, irregular pale gold transverse bars. Soft anal fin with two or

three longitudinal dark bands; all fins with black tinges.

3.21. *Channa striatus* (Bloch, 1793) (Figure 5-C)

Common Names: Striped or banded snakehead

Local Name: Nga-yant

Fin Formula: B V; D 37-46; P 15-17; V 6; A 23-29; C 13; L.l 54-57; L.tr 4/11 [36]

Diagnostic characters

Head: Large and depressed; scales on summit of head large, rosette of head-scales lies between the orbits and hence frontal head-scales forms the central plate of rosette [33]; anterior nostrils tubular; eyes moderate, its diameter 6 to 7 times in head length.

Mouth: Cleft large and oblique; lower jaw longer; maxillary extending behind the orbit.

Body: Very elongate, almost cylindrical anteriorly and somewhat compressed posteriorly [34].

Fins: Dorsal and anal fin long based [51]; pelvic fins subabdominal; pectoral fin about 2 times in head length; caudal fin rounded.

Scales: Cycloid [34].

Lateral line: Complete.

Color: Adults grey-green to black-green on upper side; from middle of side upwards pale [35], yellow to silvery; belly usually pure white. In young fishes the upper side paler, with dark blotches on flanks which may form angular bands; a dark band runs obliquely upwards from snout to edge of gill-cover. Dorsal and anal fins slightly darker in color than body, with dark patches on membrane between rays; caudal fin dark, with two distinct pale vertical bands on its base; pectoral and pelvic fins pale; dorsal fin in young with a black blotch at hind end.

3.22. *Channa panaw* (Musikasinthorn, 1998) (Figure 5-D)

Common Names: Panaw snakehead

Local Name: Nga-panaw

Fin Formula: B V; D 32-35; P 18-20; V 6; A 23-24; C 18; L.l 40; L.tr 4/8 [36]

Diagnostic characters

Head: Large and depressed; Gular part of head without patch of scales. One large scale on either underside of lower jaw, rarely two on one side of jaw [53]. Eyes moderate, anterior nostrils tubular.

Mouth: Fairly large.

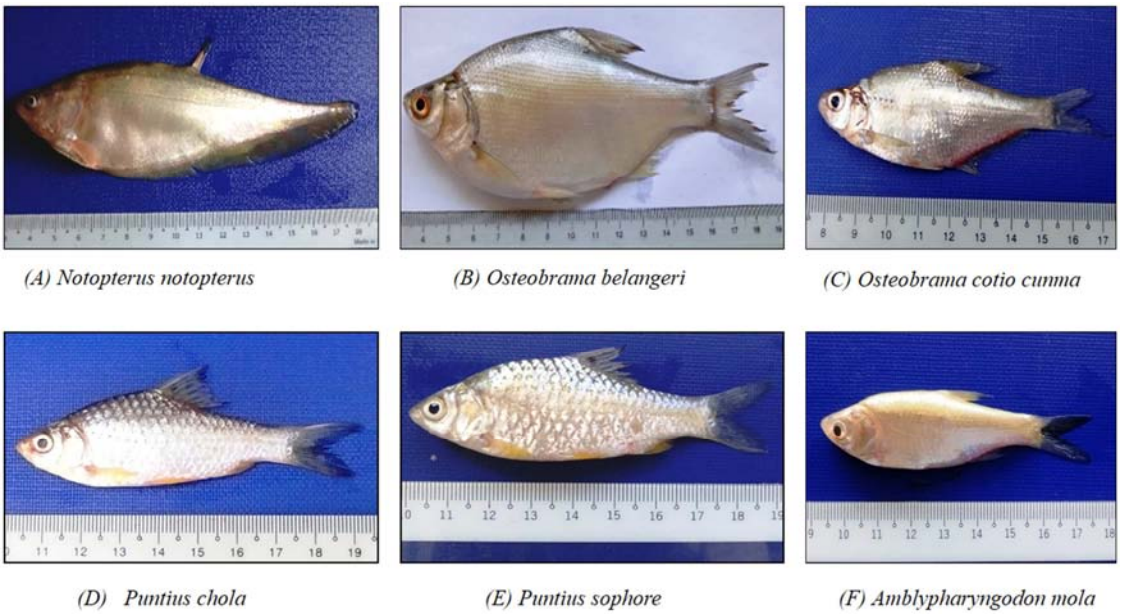
Body: Elongate, and fairly rounded in cross-section and somewhat compressed posteriorly [34].

Fins: Dorsal and anal fin long based; pelvic fins subabdominal [51]; pectoral fin about 2 times in head length caudal fin rounded.

Scales: Cycloid [34]

Lateral line: Complete

Color: Black stripes on upper side ventral side white to pale yellow, dorsal and anal fins slightly darker in colour than body [33], with dark patches on membranes between rays, caudal fin black spots, pectoral and pelvic fin pale, dorsal fin with a black at hind end.



(A) Notopterus notopterus *(B) Osteobrama belangeri* *(C) Osteobrama cotio cunma*

(D) Puntius chola *(E) Puntius sophore* *(F) Amblypharyngodon mola*

Figure 2. Recorded fish species: Order Osteoglossiformes, Cypriniformes in Moe Yun Gyi Wetland Wildlife Sanctuary.

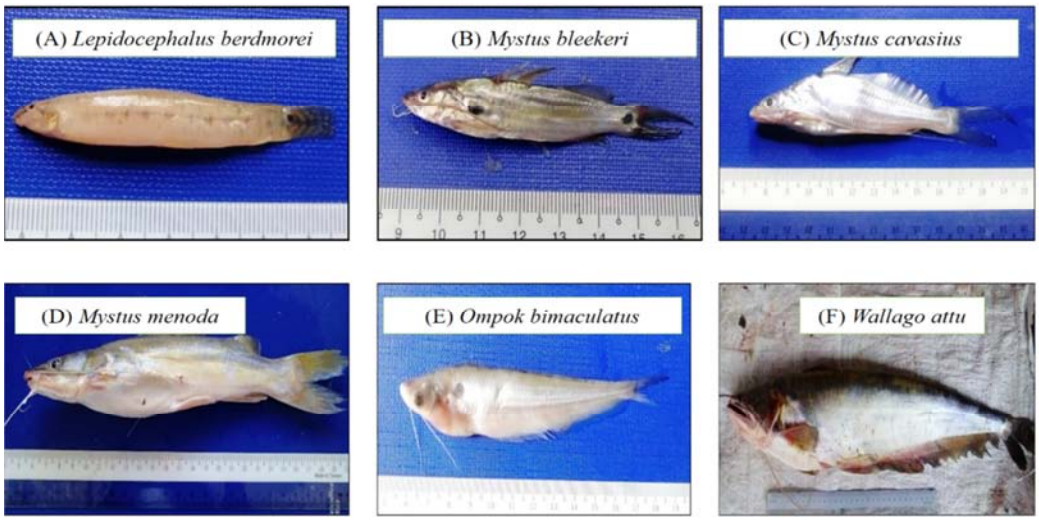


Figure 3. Recorded fish species: Order Cypriniformes and Siluriformes in Moe Yun Gyi Wetland Wildlife Sanctuary.

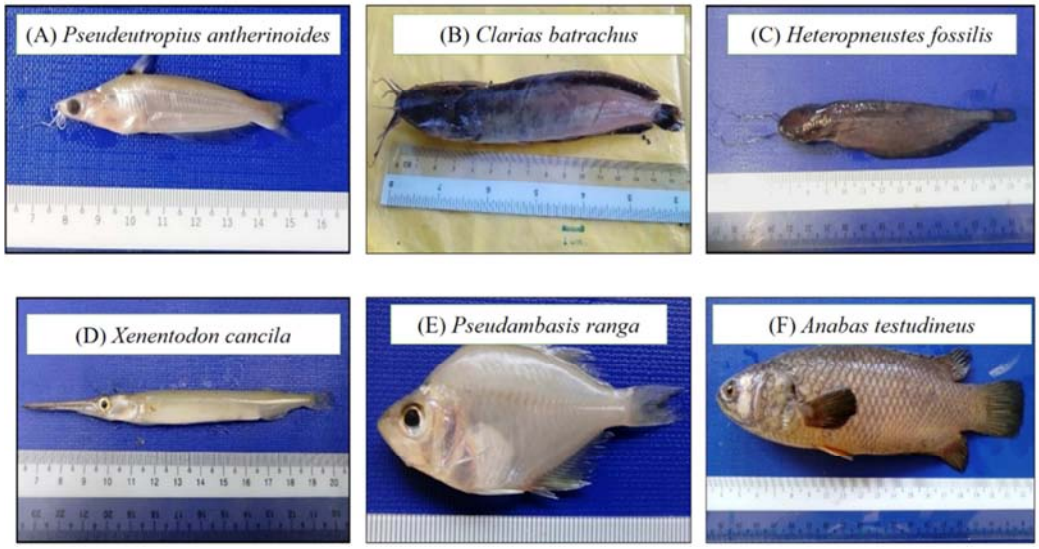


Figure 4. Recorded fish species: Order Siluriformes, Cyprinodontiformes and Perciformes in Moe Yun Gyi Wetland Wildlife Sanctuary.

Figure 5. Recorded fish species: Order Perciformes in Moe Yun Gyi Wetland Wildlife Sanctuary.

Table 1. Total recorded some species from Moeyingyi Wetland Sanctuary.

Order	Family	Scienfic Name	English Name	Local Name
Osteoglossiformes	Notopteridae	*Notopterus notopterus*	Nga-phe	Gey featherback
Cypriniformes	Cyprinidae	*Puntius sophore*	Nga-khone-ma	Spotfin swamp barb
		Puntius chola	Nga-khone-ma	Swamp barb, chola barb
		Osteobrama belangeri	Nga-phane-ma	Manipur osteobrama
		Osteobrama cotio cunma	Nga-lay-pyar	Cunma osteobrama
		Amblypharyngodon mola	Nga-bel-phyu	Mola carplet, Pale carplet
	Cobitidae	*Lepidocephalus berdmorei*	Nga-tha-lae-doh	Burmese loach
Siluriformes	Bagaridae	*Mystus bleekeri*	Nga-zin-yine	Day's mystus
		Mystus cavasius	Nga-zin-yine	Gangetic mystus
		Mystus menoda	Nga-eike	Menoda catfish
	Siluridae	*Ompok bimaculatus*	Nga-nu-than	Indian butter catfish
		Wallago attu	Nga-bat	Boal
	Schibeidae	*Pseudeutropius antherinoides*	Nga-than-chate	Indian potasi
	Clariidae	*Clarias batrachus*	Ng-khu	Walking catfish
	Heteropneustidae	*Heteropneustes fossilis*	Nga-gyee	Stinging catfish
Cyprinodontiformes	Belonidae	*Xenentodon cancila*	Nga-phaung-yoe	Freshwater garfish
Perciformes	Ambassidae	*Pseudambasis ranga***	Nga-zin-zat	Indian glassy fish
	Anabantidae	*Anabas testudineus*	Nga-pyay-ma	Climbing perch
	Belontiidae	*Colisa labiosus*	Nga- pyin-tha-let	Thick-lipped Gourami
		Trichogaster pectoralis	Mwe-mu-yay, sa-la-beya	Snakeskin Gourami
	Channidae	*Channa panaw*	Nga-panaw	Panaw snakehead
		Channa striatus	Nga-yant	Striped or banded snakehead

Table 2. Percentages of species composition by orders during the study period.

No.	Order	Number of Family	Number of Genus	Number of species	Percentage
1	Osteoglossiformes	1	1	1	8%
2	Cypriniformes	2	4	6	15%
3	Siluriformes	5	6	8	38%
4	Cyprinodontiformes	1	1	1	8%
5	Perciformes	4	5	6	31%

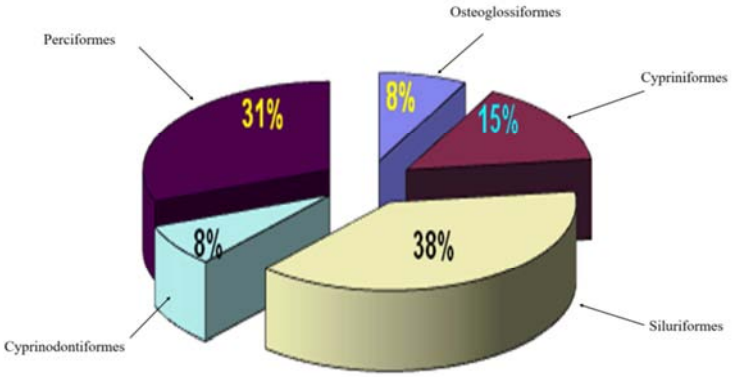


Figure 6. Percentages of species composition by orders during the study period.

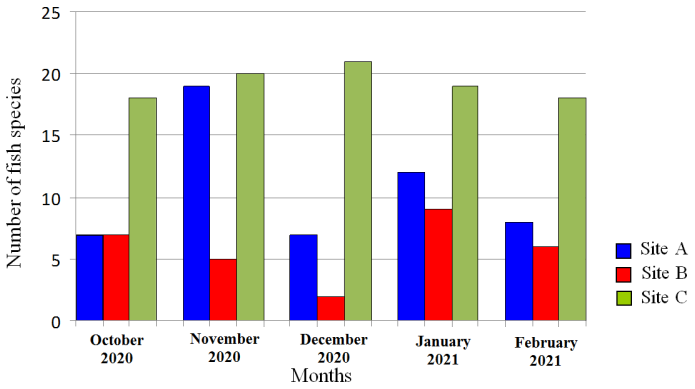


Figure 7. Monthly recorded fish species in different sites of Moe Yun Gyi Wetland Wildlife Sanctuary.

4. Discussion

In the present study, three different sites were designated as sites for a study area. During the study period from October, 2020 to February 2021, a total of 22 species were recorded. Based on the recorded data from different sites, the highest number of fish species was found in site C (22 species) [42], followed by site A (20 species) and site B (12 species). The recorded species belong to five orders; Osteoglossiformes (one species), Cypriniformes (six species), Siluriformes (eight species), Cyprinodontiformes (one species) and Perciformes (six species). Order Siluriformes with eight species was the largest number of species. The second largest groups were that of Order Cypriniformes and Perciformes, in each had six species respectively. Only one species was found in all different sites throughout the study period. It was *Channa striatus*. In some species, only one or two specimens were collected, during the data collection. It was assumed that they were rare in the study area. They are *Amblypharyngodon mola* and *Pseudeutropius antherinoides*. (Table 2).

Monthly occurrence of recorded fish was the highest in November, 2020 and lowest in December, 2020 (Figure 7). In October, Perciformes (six species) was most common in the study area. The second most common groups were Siluriformes (five species) and Cypriniformes (five species) was common groups. One species of Cypriniformes and three species of Siluriformes were not recorded [59]. In November, Siluriformes (seven species) was most common in the study area. The second most common groups were Perciformes (six species) and Cypriniformes (five species). *Osteobrama cotio cunma* and *Mystus menoda* were not recorded In December, Siluriformes (eight species) was most common in the study area. The second most common groups were Perciformes (six species) and Cypriniformes (five species). *Osteobrama cotio cunma* was not recorded. In January, Siluriformes (seven species) was most common in the study area. The second most common groups were Cypriniformes (six species) and Perciformes (six species). *Mystus menoda* was not recorded.

In February, both Siluriformes (six species) and Perciformes (six species) were most common groups in the study area. *Lepidocephalus berdmorei*, *Mystus menoda* and *Pseudeutropius antherinoides* were not recorded. Orders Osteoglossiformes and Cyprinodontiformes were found throughout the study period. (Table 2, Figure 7). The largest number fish fauna were collected from site C, the morning market. The sold fish in this market come from another site and villages near Moeyingyi Wetland Wildlife Sanctuary. In all study sites the composition of recorded fish species was found to be the highest in the Order Siluriformes (38%), followed by Perciformes (31%), Cypriniformes (15%) and Osteoglossiformes and Cyprinodontiformes (each with 8%) (Table 1, Figure 6) [42]. Catfishes are important parts of the fish fauna in wetlands, many of them are economically important with high nutritive value [13, 17, 57]. Asia, including the subcontinent of India, is home to wide variety of catfishes. Catfishes from the families Cranolanididae, Siluridae, Schilbeidae, Clariidae, Akysidae, Amblycipitidae, Heteropneustidae, Parakysidae, Chacidae, Pangasiidae, Plotosidae, Ariidae, Sisoridae, and Bagridae can all be found in Asia. One of the largest families in Asia is the family [25, 28-31].

(Meydani et al., 1991), recognized the family Bagridae has a huge range and members of this family can be found throughout all of Asia, Africa, and the Middle East [39]. In December 2013, the fish fauna of Moeyingyi Wetland Wildlife Sanctuary had been formerly studied by BANCA (2014). A total of 37 fish species were recorded during their period. Altogether 37 species, 31 genera under 23 families were recorded. There are five species recorded in this survey which assumed by the conservation status of IUCN Red List (2013) as Near Threatened (NT). The rest 28 species were recorded as Least Concern (LC). Near Threatened Fish species recorded in Moeyingyi Wetland Wildlife Sanctuary were *Tilapia mossambica, Osteobrama belangeri, Catla catla, Ompok bimaculatus* and *Wallago attu.* The former three species were not found throughout the study period. In their study period, *Anabas testudineus* were recorded as data deficient fish species found in Moeyingyi Wetland Wildlife Sanctuary. In present study, *Anabas testudineus* were found in the site A and C during study period except site B.

5. Conclusion

Fish samples were collected from three different sites in Moe Yun Gyi Wetland Wildlife Sanctuary. The study period lasted from October, 2020 to February, 2021. A total of 22 species belonging to 17 genera, 13 families and five orders were recorded. In present study, Siluriformes and Perciformes were most common in the study area [37]. Order Siluriformes was most abundant in November, December, January and February. Order Perciforms was most abundant in October and February. Recorded data indicates that the largest group of fish was from the Order Siluriformes followed by Order Perciformes. Order Osteoglossiformes and Cyprinodontiformes were found throughout the study period. In the study site A has the most abundant of fish fauna in December, 2020 and study site B was the smallest in December, 2020.

Acknowledgements

The authors would like to thank School of Environment, Northeast Normal University, and Changchun, China. My

sincere thanks also go to Teacher Daw Aye Aye Than, Department of English, Bago University, for her valuable optimistic encouragement. We are also greatly indebted to Department of Zoology, Bago University, Bago Division, and Myanmar [50]. We are also deeply thankful to researchers of Future Myanmar Organization, Bago Division Myanmar.

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