ISSN No:-2456-2165

Occurrence of Market Fishes from Taunggyi Township, Southern Shan State, Myanmar

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Abstract:- The recorded fish species were collected from Myoma Market of Taunggyi Township in Southern Shan State, Myanmar. The study period lasted from January to December, 2017. A total of 28 species belonging to 25 genera 18 families under seven orders were recorded. Among the recorded species, the freshwater and brackish water fishes were more abundant and transported from Yangon. And then *Oreochromis niloticus* (Nile tilapia) and *Bangana horai* (Ostroretka salvinska) were the most found in the market and these were maximum size attained 23.2 cm and 17.9 cm. According to the interview survey, 20 species of market fishes from Taunggyi environs and ten transported market fish species from Yangon were recorded. *Cirrhinus mrigala* (Common carp) and *Labeo rohita* (Rohu) were recorded from both environs.

Keywords:- *Abundant; Freshwater; Brackish Water.*

I. INTRODUCTION

Fishes have great commercial value and receive special attention of scientists all over the world. Fishes exhibit enormous diversity in their morphology, in the habitats they occupy, and in their biology. Fishes constitute almost half of the total number of vertebrates. Over the world there are so many kinds of fishes, and are classified into 46 orders, 450 families, 4032 genera, and 18818 species. The inland waters of India and adjacent countries including Myanmar teem with 930 fish species [11].

Fish and fish products are a major source of protein and comparatively much favorable than other food sources. Food and Agriculture Organization of the United Nation stated that fish accounts for more than forty percent of the protein in the diet of two-thirds of the global population [1].

Myanmar people have preferred freshwater fish to meat since the time before Myanmar saw commercial scale freshwater fish farming. Fish cooked in various manners is included as a dish in the daily diet. Fish is eaten fresh or preserved variously into dried, smoked, salted and pickled fish or in the form of paste and sauce [6].

Taunggyi is the capital of Shan State, Myanmar. It has an estimated population of 280, 665 as of year 2014, making it the fifth largest city in Myanmar, and is at an elevation of 4712 feet (1,436 m) above sea level. The busiest part of Taunggyi is the Myoma Market, a place where people from the environs used to flock only once every five days to buy and sell their regional products. Now it has become a daily market and is constantly crowded with people. The present study was conducted with the following objectives:

- to record and classify the fish species on sale in the market
- to examine the morphometric measurements of the recorded fish species
- to determine the different environs of the recorded fish species in the market

II. MATERIALS AND METHODS

The study site, Myoma Market is located between 20° 47' 13.9" N and 97° 02' 10.3" E which is situated in Taunggyi Township, Southern Shan State, Myanmar. The study period lasted three months from January to December, 2017. All specimens on sale were collected from Myoma Market of Taunggyi and its environs. The local names of the collected fish species were determined by interview with the fishmongers of the market. Collected specimens were preserved in 10% formalin and some preserved specimens were kept in plastic containers for detailed study. Photographs of the fresh specimens were taken to record their natural coloration. Five individuals of each species were identified, classified and measured for the total length (length from the tip of the snout to the end of the tail), the standard length (length from the tip of the snout to the end of the caudal peduncle), the head length (length from the tip of the snout to the end of the operculum) in cm and total body weight (g). Identification of the recorded market fishes were done after [11], [8] and [4].

III. RESULTS AND DISCUSSION

A total of 28 fish species belonging to 25 genera, 18 families and seven orders were recorded on sale in the market (Table1).

A. Identification and Classification of the Recorded Fish Species

The recorded fish species were identified and classified and placed under 25 genera, 18 families and seven orders. Most recorded fish species (24) were native species except four species were introduced species (i.e. *Barbodes gonionotus*, *Cyprinus carpio*, *Oreochromis niloticus* and *Trichogaster pectoralis*) from Africa, Thailand and Indonesia (Table1).

ISSN No:-2456-2165

Most recorded fishes were freshwater and brackish water species (17) but six species were freshwater and three species were marine water. *Tenualosa toil* (Toli shad) and *Glossogobius giuris* (Tank goby) were freshwater, brackish and marine water species [2], [9] and [10]. Among the recorded species, the freshwater and brackish water fishes were more abundant and the latter were transported from Yangon Region.

No.	Species	Common Name	Status	Habitat
1	*Tenulosa toli*	Toli shad	native	FBMW
2	*Lepidocephalichthys berdmorei*	Myanmar loach	native	FW
3	*Bangana horai*	Ostroretka salvinska	native	FBW
4	*Barbodes gonionotus*	Tawes	introduced	FBW
5	*Cirrhinus mrigala*	Mrigal	native	FBW
6	*Cyprinus carpio*	Common carp	introduced	FBW
7	*Cyprinus intha*	Inlae common carp	native	FW
8	*Esomus caudiocellatus*	Flying barb	native	FW
9	*Labeo rohita*	Rohu	native	FBW
10	*Osteobrama alfredianus*	Carplet	native	FW
11	*Puntius chola*	Swamp barb	native	FW
12	*Notopterus notopterus*	Bronze feather back	native	FBW
13	*Parambassis ranga*	Glass fish	native	FBW
14	*Channa gachua*	Brown snakehead	native	FBW
15	*Channa panaw*	Spotted snakehead	native	FBW
16	*Channa striata*	Snakehead murrel	native	FBW
17	*Oreochromis niloticus*	Nile tilapia	introduced	FBW
18	*Glossogobius giuris*	Tank goby	native	FBMW
19	*Nemipterus japonicus*	Japanese threadfin bream	-	MW
20	*Trichogaster pectoralis*	Snakeskin gourami	introduced	FW
21	*Auris thazrd*	Frigate mackerel	-	MW
22	*Pampus argenteus*	Silver pamfret	-	MW
23	*Sperata seenghala*	Giant river catfish	native	FBW
24	*Clarias batrachus*	Walking catfish	native	FBW
25	*Pangasius pangasius*	Yellowtail catfish	native	FBW
26	*Wallago attu*	Wallago	native	FBW
27	*Mastacembelus armatus*	Zigzag eel	native	FBW
28	*Monopterus albus*	Swamp eel	native	FBW

FW=Freshwater, FBW=Freshwater and brackish water, FBMW=Freshwater, brackish and marine water, MW= Marine water

Table 1:- List of Market Fish Species Recorded from Study Site

B. Morphometric Measurements of Recorded Market Fishes

Total length, standard length, head length and body weight of recorded fish species were shown in Table 2. Among the recorded species, *O. niloticus* (Nile tilapia) and B. *horai* (Ostroretka salvinska) were the most abundant in the market and these attained maximum sizes of 23.2 cm and 17.9 cm respectively. Among the studied species, *Mastacembelus armatus* (Zigzag eel) was rarely found in the market.

The tilapia, which is omnivorous, has good reproductive nature, compare to other species. This species can resist detrimental environments. However tilapia in Inle Lake seems to enjoy good natural conditions of the lake. The distribution of tilapia is best estimated as covering the whole area of the lake [7] and [12].

Typical aquaculture ponds are stocked with a number of species on an annual basis; the favoured species are *C. mrigala* (Rohu) and *L. rohita* (Common carp), although

some tilapia may also be found in larger ponds in Shan State [5].

In Asia, *Bangana horai* was known only from Inle Lake of Myanmar [3].

No.	Species	Mean(range)			
		TL (cm)	SL (cm)	HL (cm)	BW (g)
1	*T. toli*	38.6 (38.0-40.0)	31.0 (29.0-32.0)	7.8 (7.0-8.0)	510 (420-570)
2	*L. berdmorei*	8.6 (8.0-9.0)	7.2 (6.8-7.5)	1.4 (1.2-1.5)	9.7 (9-10)
3	*B. horai*	17.9 (15.5-19.7)	14.8 (13.0-16.0)	3.0 (2.9-3.0)	64.6 (55-70)
4	*B. gonionotus*	20.9 (20.0-22.0)	16.9 (16.0-18.0)	4.3 (4.0-5.0)	139 (130-160)
5	*C. mrigala*	46.2 (40.0-55.0)	37.1 (30.0-46.5)	7.9 (7.0-9.5)	1003 (800-1600)
6.	*C. carpio*	26.1 (20.2-30.0)	22.2 (16.8-27.0)	5.3 (4.4-6.0)	219 (145-300)
7	*C. intha*	26.5 (25.0-30.0)	22.0 (20.0-27.0)	5.5 (5.0-6.0)	264 (220-300)
8	*E. caudiocellatus*	6.9 (6.5-7.5)	6.1 (5.7-6.8)	1.0 (1.0-1.2)	3.2 (2-4)
9	*L. rohita*	44.5 (43.0-46.5)	35.7 (34.0-39.0)	9.4 (9.0-10.0)	904 (860-970)
10	*O. alfredianus*	21 (19.0-23.0)	17.5 (16.8-18.0)	4.7 (4.5-5.0)	52 (40-65)
11	*P. chola*	7.7 (5.5-9.0)	6.1 (5.0-7.5)	1.8 (1.2-2.5)	9.8 (8-12)
12	*N. notopterus*	21.2 (19.0-23.5)	20.2 (14.5-22.5)	4.5 (4.0-5.0)	71.1 (50-100)
13	*P. ranga*	6.7 (6.0-7.5)	5.36 (4.8-6.5)	1.7 (1.5-2.0)	9.8 (9-10)
14	*C. gachua*	16.5 (11.4-19.0)	13.7 (9.5-16.0)	3.7 (2.7-5.0)	28.4 (12-45)
15	*C. panaw*	14.7 (13.0-16.0)	12.9 (11.5-14.5)	4.2 (2.5-5.0)	34 (20-45)
16	*C. striata*	38.2 (30.0-54.0)	33.9 (27.0-46.5)	9.9 (9.0-2.0)	394 (300-600)
17	*O. niloticus*	23.2 (21.0-24.0)	18.7 (17.0-19.5)	6.5 (6.0-7.0)	223 (190-250)
18	*G. giuris*	17.0 (15.0-20.0)	14.6 (13.0-17.0)	3.8 (3.0-4.5)	22 (15-20)
19	*N. japonicus*	19.2 (16.0-21.0)	15.8 (13.5-17.5)	4.9 (4.5-5.0)	92 (55-130)
20	*T. pectoralis*	18.3 (17.0-20.5)	14.3 (13.5-16.5)	3.7 (3.5-4.5)	43.4 (40-50)
21	*A. thazrd*	35.4 (31.0-39.0)	30.4 (27.0-34.0)	36.5 (6.5-8.5)	430 (270-500)
22	*P. argenteus*	23.3 (23.0-23.5)	16.9 (16.5-17.5)	3.9 (3.5-4.0)	181 (170-195)
23	*S. seenghala*	26.2 (24.0-30.0)	21.0 (19.0-24.5)	5.2 (4.5-6.0)	166 (140-200)
24	*C. batrachus*	32.6 (31.0-38.0)	29.6 (27.0-38.0)	8.5 (7.0-12.0)	209 (175-250)
25	*P. pangasius*	76.6 (70.0-83.0)	68.8 (65.0-73.0)	14.3 (14.0-15.0)	6420 (5800-6800)
26	*W. attu*	24.5 (19.0-28.5)	21.6 (19.5-25.0)	4.8 (4.0-5.5)	107 (100-120)
27	*M. armatus*	33.1 (30.0-37.5)	31.5 (29.0-35.0)	3.8 (3.5-4.0)	90(80-100)
28	*M. albus*	49.0 (46-55.5)	48.2 (45.0-54.5)	4.1 (4.0-4.5)	102(80-125)

TL= Total Length, SL= Standard Length, HL= Head Length,
BW= Body Weight

Table 2:- Morphometric Measurements of the Recorded Fish Species from Myoma Market

ISSN No:-2456-2165

C. Source Environs of the Recorded Market Fishes

According to the interview survey, 20 species of the recorded market fishes on sale were from Taunggyi environs such as Inle Lake, streams, creeks, small - scale aquaculture and licensed fish ponds but ten were transported fish species from Yangon environs. The freshwater species of *Esomus caudiocellatus* (Flying barb) on sale was from hilly regions and lowland streams. *C. mrigala* (Rohu) and *L. rohita* (Common carp) were from both Taunggyi and Yangon environs (Table 3).

There was demand for common carp in Shan State, although this was being produced for stocking both local ponds and export to Yangon. In present study, the common carp was recorded not only from source around Taunggyi environs but also as transported fish from Yangon environs [5].

No.	Species	Market Fishes from Taunggyi Environs	Transported Fishes from Yangon
1	*T. toli*		✓
2	*L. berdmorei*	✓	
3	*B. horai*	✓	
4	*B. gonionotus*	✓	
5	*C. mrigala*	✓	✓
6	*C. carpio*	✓	
7	*C. intha*	✓	
8	*E. caudiocellatus*	✓	
9	*L. rohita*	✓	✓
10	*O. alfredianus*		✓
11	*P. chola*	✓	
12	*N. notopterus*	✓	
13	*P. ranga*	✓	
14	*C. gachua*	✓	
15	*C. panaw*	✓	
16	*C. striata*	✓	
17	*O. niloticus*	✓	
18	*G. giuris*	✓	
19	*N. japonicus*		✓
20	*T. pectoralis*	✓	
21	*A. thazrd*		✓
22	*P. argenteus*		✓
23	*S. seenghala*		✓
24	*C. batrachus*	✓	
25	*P. pangasius*		✓
26	*W. attu*		✓
27	*M. armatus*	✓	
28	*M. albus*	✓	

✓= present

Table 3:- Source Environs of the Recorded Fish Species from Myoma Market

D. Number of Recorded Species (% of Total) Belonging to Different Orders

Regarding the total of 28 market fish species recorded, order Cypriniformes and Perciformes were highly represented by ten and nine species (35.7% and 32.1% of total) respectively, followed by order Siluriformes at four species (14.3%), Synbranchiformes at two species (7.1%) and Clupeiformes, Osteoglossiformes and Pleuronectiformes at only one species each (3.6%) respectively among the 28 fish species on sale in Myoma Market (Fig. 1).

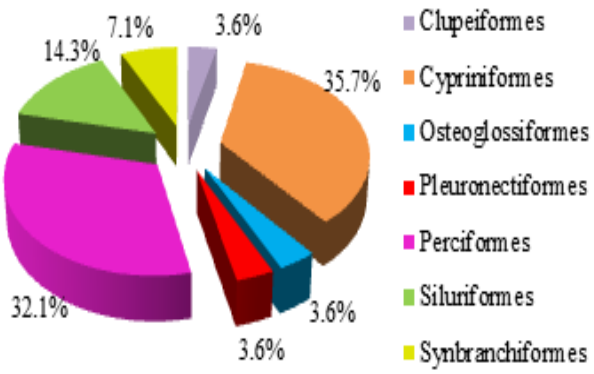

Fig 1:- Number of Recorded Species (% of Total) Belonging to Different Orders

IV. CONCLUSION

A total number of 28 species of market fishes were recorded belonging to 25 genera and 18 families under the orders Clupeiformes, Cypriniformes, Osteoglossiformes, Pleuronectiformes, Perciformes, Siluriformes and Synbranchiformes. Analysis revered that a majority of 20 species were marketed from environs of Taunggyi. This reflected the current state of the local fish fauna. During the present survey, *C. mrigala* and *L. rohita* were recorded as marketed from both source environs of Taunggyi and Yangon. We assume that the regional people could afford these two species of *C. mrigala* and *L. rohita* as they were cultivated locally and the transported fishes from Yangon were much more expensive. It is known that mature tilapias usually breed 6-8 times in a year and they are highly aggressive when breeding and they actively defend their territories. This rapid reproduction strategy, together with their aggressive behaviour, *O. niloticus* (Nile tilapia) can quickly exclude native fishes and become the most dominant fish species if they escape to nature from where they are introduced for pond culture. *B. horai* (Ostroretka salvinska) found only in Myanmar must be maintained not to disappear gradually from local fauna. Owing to IUCN list, it is listed as endangered species. However this species was abundantly on sale in Taunggyi Market due to their high occurrence in Inle Lake. The basic information obtained from the present study could promote further study of fish fauna and their respective habitats in Taunggyi environs.

ACKNOWLEDGEMENTS

We extend our profound gratitude to Professor Dr. Thidar Lay Thwe, Head of the Department of Zoology, University of Yangon for her keen interest and also for her permission to conduct this work. We extend our special obligation to Professor Dr. Aye Mi San, Department of Zoology, University of Yangon for her guidance encouragement to accomplish this study. We are grateful to Professor Dr. Khin Maung Swe (Retired), Head of the Department of Zoology, Dagon University, for his untiring patience, invaluable guidance, advice and criticisms rendered through this study.

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