

A Study on Some Myanmar Ornamental Fish Species in Inlay Lake

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Abstract

The taxonomical studies of ornamental fishes of Inlay Lake were carried out. This study has recorded the occurrence of 12 species of ornamental fishes belonging to three orders and six families representing ten genera. Five species were recorded as endemic to Inlay Lake and its environments. About four of exported species were described in detail. The status of the studied species in the lake were discussed.

1. Introduction

The custom of ornamental fish keeping is a hobby of worldwide interest. Ornamental fish is considered as a favourable pets in many countries. Diversity of species of ornamental fishes available the aquarium hobby increased in the last fifty years. Today, ornamental fish industry stands as a part of main source of economy in many countries. Southeast Asian countries like Singapore, Malaysia, Thailand and the Philippines are famous for the ornamental fish trade. Among them, Myanmar ornamental fish business was initiated during 1978 and since then it has been becoming popular in Myanmar (Roy Mya Thein, 1995). Since Myanmar possess extensive inland water bodies like lake, ponds, inns and river systems, these large water bodies provide excellent feeding and breeding grounds for a variety of tropical fishes. Ayeyarwaddy River Basin, Indawgyi Lake, Inlay Lake and Taung-Tha-Man Inn are very famous for both historically and commercially in Myanmar. Among them, Inlay Lake is famous for its crystalline waters, leg-rowers and many endemic species. It is situated in Nyaung Shwe Township, Southern Shan State. It is about 22 km long and 6 km wide and located at 1000 m above sea level (Ferraris, Kullander & Fang, 2002)(Fig. 1, Plate I). The lake is surrounded by marshland, composed of dead and living vegetation matted together and floating on the surface of water. Floating gardens have been constructed within the lake. The pH of the water varies from 8.2 to 8.5. Inlay Lake has also been nominated as one of the freshwater biodiversity hotspots by the World Conservation Monitoring Centre (WCMC) based on its fishes and mollusks. Biodiversity hotspots are those areas that combine high diversity, high endemism and a high degree of threat, and which are most likely to lose significant portion of their biodiversity over a next few decades (WCMC, 1998). This lake has a variety of ornamental fish species and most of them are popular among ornamental fish hobbyists. The present study was conducted with the following main objectives:

- (1) To record new and endemic ornamental fish species from Inlay Lake and its environments.
- (2) To seek the major threats facing fish and their natural habitats.
- (3) To study the abundance of some fish species in particular habitats from ecological aspects.

2. Materials and Methods

The specimens were collected from Mine Thauk Inn, The Le Oo Inn, Ywa Ma Village and Nam Pan Village which were situated at the eastern, southern and south western part of the lake. Three field trips were made from 2004, January to 2004, November. All the reliable informations like the abundance of fish and scarcity of fish were recorded from the local fishermen. Bamboo traps and triangular push net were widely used for fish collection (Plate II A, B).

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At least ten live specimens of each species were used for the taxonomic study. The colour, size and external morphology of the collected specimens were recorded immediately in the field. All the essential measurements were taken during the trip (Plate III A, B). Live specimens were carefully kept in the plastic bags, filled with oxygen and brought them back and were maintained in the aquarium tanks (2' x 3' x 1½')(Plate III C, D). For photography, live specimens were transferred into a small glass tank (½' x ½' x ¼') aided by glass plate to avoid light reflection. Sketch drawings were made by using a stereo dissecting microscope. The identification of the fish species were based on fresh specimens and alcohol preserved specimens as followed by Jayaram (1981), Nelson (1984), Talwar and Jhingram (1991) and Rainboth (1996).

3. Results

Systematic position of the studied fish

Phylum	- Chordata
Grade	- Pisces
Class	- Osteichthyes
Order	- Osteoglossiformes
Family	- Notopteridae
Genus	- <i>Notopterus</i> Lacepede, 1800
Species	- <i>Notopterus notopterus</i> (Pallas, 1769)
Order	- Cypriniformes
Family	- Cyprinidae
Subfamily	- Cyprininae
Genus	- <i>Sawbwa</i> Annandale, 1918
Species	- <i>Sawbwa resplendens</i> Annandale, 1918
Genus	- <i>Puntius</i> Hamilton, 1822
Species	- <i>Puntius stoliczkanus</i> (Day, 1878)
Subfamily	- Cultrinae
Genus	- <i>Inlecypris</i> Howes, 1980
Species	- <i>Inlecypris auropurpureus</i> (Annandale, 1918)
Subfamily	- Rasborinae
Genus	- <i>Microrasbora</i> Annandale, 1918
Species	- <i>Microrasbora erythromicron</i> Annandale, 1918 - <i>M. rubescens</i> Annandale, 1918
Family	- Cobitidae
Subfamily	- Cobitinae
Genus	- <i>Lepidocephalichthys</i> Bleeker, 1863
Species	- <i>Lepidocephalichthys berdmorei</i> (Blyth, 1860)

Subfamily	- Botiinae
Genus	- <i>Botia</i> Gray, 1831
Species	- <i>Botia histrionica</i> (Blyth, 1860)
Family	- Balitoridae
Genus	- <i>Yunnanilus</i>
Species	- <i>Yunnanilus brevis</i> (Boulenger, 1893)
Order	- Perciformes
Suborder	- Anabantoidei
Family	- Belontiidae
Subfamily	- Trichogastrinae
Genus	- <i>Colisa</i> Cuvier, 1831
Species	- <i>Colisa labiosa</i> (Day, 1878)
Suborder	- Mastacembeloidei
Family	- Mastacembelidae
Genus	- <i>Mastacembelus</i> Scopoli, 1777
Species	- <i>Mastacembelus caudiocellatus</i> Boulenger, 1893 <i>M. oatesii</i> Boulenger, 1893

Taxonomic descriptions of the studied fish

Sawbwa resplendens Annandale, 1918 (Plate IV A)

Synonyms	- None
Common name	- Sawbwa barb
Local name	- Nga-tange-kyebya
Fin formula	- D.ii-iii/7, A.ii/5, P.7, V.7
Total length	- 20.0 mm - 27.0 mm \pm 1.67
Standard length	- 15.0 mm - 21.0 mm \pm 1.54

Body rather elongate and compressed. Mouth small, terminal and oblique, the upper jaw protrusible; no barbels. Second or third simple ray of dorsal fin osseous, stout and serrated in the middle region. Pectoral fins small. Caudal fin strongly forked. Body scales. It has silvery coloured and more or less suffused with green pigment on back and blackish on dorsal surface of head. Fins usually hyaline. Rows of minute dots running parallel to the rays.

It is abundantly found all over the lake. They live in large shoals among dense vegetation both in the clear waters of the edge. This species is economically important to the local people as the dried fish which is one of the chief products of the lake.

***Inlecypris auropurpureus* (Annandale, 1918)(Plate IV B)**

Synonyms	- <i>Barilius auropurpureus</i> Annandale, 1918 <i>Inlecypris auropurpureus</i> Howes, 1980
Common name	- Burmese hatchet
Local name	- Nga-nyaung-shae, Nga-la-wah
Fin formula	- D.ii/7, A.ii/5, P.i/11, V.i/6, L.1.39-41, L.tr.7½/1½
Total length	- 84.0 mm - 90.0 mm ± 1.94
Standard length	- 69.0 mm - 75.0 mm ± 1.91

Body slender, elongate and laterally compressed. Head is long and narrow. Snout sharply pointed. Eyes are large, prominent and lateral in position. Mouth is obliquely angled and directed upwards. No barbels. It has three rows of pharyngeal teeth. Dorsal fin inserted directly above anal fin. Anal fin based distinctly longer than dorsal fin base. Pectoral fins long and narrow, extend beyond base of pelvic fins. Caudal fin deeply forked. Scales are cycloid and large. Lateral line complete and curved rather abruptly downwards above pectoral fin. Silvery, greenish colouration on back and flanks; about 14 bluish vertical bars on the middle part of the sides. The fins are white and bear rows of minute black dots parallel to the rays.

It is common in the lake. It has gregarious habits and swimming immediately below the surface.

***Microrasbora erythromicron* Annandale, 1918 (Plate IV C)**

Synonyms	- None
Common name	- Emerald dwarf rasbora
Local name	- Nga-tha-phwe-mae-ta-pauk
Fin formula	- D.i-ii/8, A.i-ii/8-9, P.i/13, V.i/6, L.1.21-25, L.tr.7
Total length	- 31.0 mm - 40.0 mm ± 2.81
Standard length	- 25.0 mm - 34.5 mm ± 2.92

Body is short and compressed; the depth of the body is about ¼ of the total length. The scaly sheaths of the dorsal and caudal are well-developed. Head is moderately large; snout is much smaller than eyes. Eyes are large and prominent. Mouth is small and oblique. No barbels. It has three rows of pharyngeal teeth. Dorsal fin inserted opposite in advance of anal fin. Pectoral fin is almost touching to the base of ventral fin. Caudal fin is forked. Scales are cycloid and large. Lateral line absent. The colouration of the whole body is deeply suffused with scarlet, the 12 blue vertical stripes on the sides and a black spot surrounded by a pale ring on the caudal peduncle. All fins hyaline.

This gorgeous little fish was taken only at the edge of the Inlay Lake, among the stems of decaying grass from floating islands. They were exported as aquarium fish since 1991 and gradually in good demand for its attractive colouration.

***Microrasbora rubescens* Annandale, 1918 (Plate IV D)**

Synonyms,	- None
Common name	- Burmese microrasbora
Local name	- Nga-thu-nge-seine
Fin formula	- D.ii/7, A.iii/10, P.i/11, V.i/6, L.l.29-32, L.tr.7
Total length	- 32.0 mm - 41.7 mm \pm 3.06
Standard length	- 25.0 mm - 34.5 mm \pm 3.05

Body is moderately elongated and laterally compressed. Head is large and compressed. Eyes are large and prominent. Mouth is small, almost semicircular and opens obliquely upwards. No barbels. It has three rows of pharyngeal teeth. Dorsal fin inserted slightly ahead of anal fin. Anal fin is rather long. The caudal fin is deeply forked. It has cycloid scales and moderate. The sides and ventral surface of the body is orange scarlet colour. A dark mid-lateral streak extending forwards from base of caudal fin. The species is abundantly found in Inle Lake. It is one of the exported Myanmar ornamental fish species since 1990.

4. Discussion

The taxonomical studies of ornamental fishes of Inlay Lake were carried out. The study has revealed that occurrence of 12 species of ornamental fishes belonging to three orders and six families representing ten genera. Five species namely *Sawbwa resplendens*, *Inlecypris auropurpureus*, *Microrasbora erythromicron*, *M. rubescens* and *Mastacembelus oatesii* were found to be endemic to Inlay Lake and its environments (Fish Base, 2004).

Tin Win (2003) reported the occurrence of over 70 ornamental fish species in Myanmar. Roy's Aquacultural F.A.M.E Enterprise, Lin Ah Yone Co., Ltd., Green Island Co. Ltd., also listed the occurrence of over 45 species of ornamental fish in the country (Personal Communication). Of all these exported ornamental fishes, four of Inlay endemic species *Sawbwa resplendens*, *Inlecypris auropurpureus*, *Microrasbora erythromicron* and *M. rubescens* are popular among fish hobbyists. According to the field recorded data, these species are still abundantly found in the Lake except *M. erythromicron* which is one of the highest demand among the exported species of the lake. People caught this species not only for the export purpose but also for the subsistence of the local people. This species population could be decreased in the coming years due to over exploitation.

It is not easy to separate edible fish and ornamental fish since local people consume these fishes as subsistence. These small fishes are of economic importance to the local people as the dried fish that is one of the chief products of the lake (Plate V A, B). The present study has shown the occurrence of only 12 species of ornamental fish in Inlay Lake and there might be still have some small fishes which could be used as ornamental fish from this area. Local people income could be increased with the use of these fish as exported ornamental fish.

These small fishes are generally taken in traps set in the vegetation or with a triangular push net. The ornamental fish catching methods is used for food fish. The fishing gears for ornamental fish are modified to be harmless to the fish in order to market the live healthy fish and also to reduce the mortality of fish.

In conclusion, these small fishes have been harvesting and the speed of the exploitation is increased in the lake. Also, runoff of pesticides and fertilizer from the floating gardens polluted the lake and affected the natural habitats of the aquatic species. Therefore, fluctuation

of resources in the areas should be monitored and over exploitation and distribution of their habitats must be avoided. Many of the Inlay endemic fish species can be induced to breed in captivity, spawn, fertilize, culture and most profitably can be exported to other countries in the world.

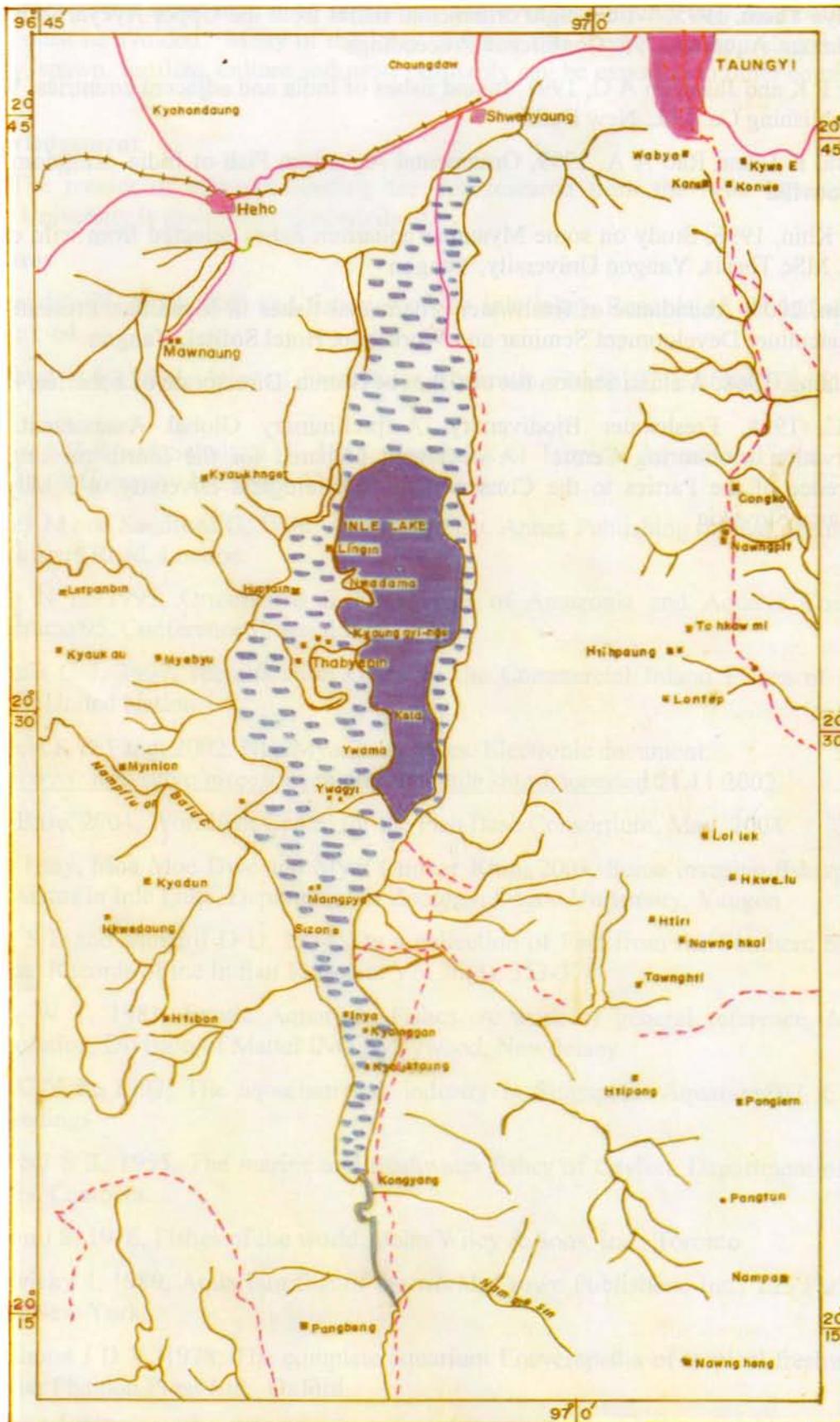
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References

1. Annandale N, 1918, Fish and fisheries of the Inle lake. Records of the Indian Museum XIV: 1-64
2. Axelord H R, 1997, Atlas of Freshwater Aquarium Fishes. 9th Edition. The Publications Inc.
3. Axelord H R and Schultz L P, 1955, Handbook of Tropical Aquarium Fishes. Mc.Graw Hill Book Company Inc., New York
4. Bailey M and Sandford G, 1996, Aquarium Fish. Annes Publishing limited, Hermes House, Blackfriars Road, London
5. Chao N L, 1995, Ornamental fish resources of Amazonia and Aquatic Conservation. Aquarama'95. Conference Proceedings
6. Ferraris C J, 1997, Identification Guide to the Commercial Inland Fishes of Myanmar. F.A.O, United Nation
7. Ferraris K & Fang, 2002, Nga Myanmar Fishes. Electronic document, <http://www.nrm.sc/vc/pisces/myanmar/myaninle.shtml>.accessed 21.11.2002
8. Fish Base, 2004, Worldfish Centre for the Fish Base Consortium, May, 2004
9. Htay Htay, Moe Moe Dwe and Myat Ommar Khin, 2003, Some invasive fish species and their status in Inle Lake. Department of Zoology, Dagon University, Yangon
10. Hora S L and Mukerji D D, 1934, On a collection of Fish from the Southern Shan State, Burma. Records of the Indian Museum. Vol.36(3), 353-370
11. Innes W T, 1981, Exotic Aquarium Fishes. A work of general reference. Metafrome Corporation, Division of Mattel ING., Maywood, New Jersey
12. Lee K Y K, 1997, The aquarium fish industry in Singapore. Aquarama'97. Conference Proceedings
13. Munro I S R, 1955, The marine and freshwater fishes of Ceylon. Department of External Affairs, Cambera.
14. Nelson J S, 1976, Fishes of the world. John Wiley & Sons, Inc., Toronto
15. Petrovicky' I, 1989, Aquarium fish of the world. Crown Publishers, Inc., 225 Park Avenue south, New York
16. Ramshorst J D V, 1978, The complete aquarium Encyclopedia of tropical freshwater fish. Elsevier Phaidon Press Ltd., Oxford
17. Ricker W E, 1970, Methods for assessment of fish production in fresh waters. Blackwell Scientific Publications, Oxford

18. Roy Mya Thein, 1995, Wild caught ornamental fishes from the Upper Ayeyarwaddy River in Myanmar. Aquarama' 95. Conference Proceedings
19. Talwar P K and Jhingran A G, 1991, Inland fishes of India and adjacent countries. Vol.I+II, IBH Publishing Co. Ltd., New Delhi
20. Tekriwal K L and Rao A A, 1999, Ornamental Aquarium Fish of India. Kingdom Books. Waterlooville
21. Tin Ei Khin, 1996, Study on some Myanmar aquarium fishes selected from wild catch for export. MSc Thesis, Yangon University, Yangon
22. Tin Win, 2003, Abundance of freshwater ornamental fishes in Myanmar. Presented paper on Aquaculture Development Seminar and Workshop, Hotel Sofitel, Yangon
23. Tint Hlaing, 1968, A classification list of fishes of Burma. Directorate of fisheries, Burma
24. WCMC, 1998, Freshwater Biodiversity. A preliminary Global Assessment. World Conservation Monitoring Centre. A document prepared for the fourth meeting of the Conference of the Parties to the Conservation on Biological Diversity, 4-5 May, 1998, Bratislava, Slovakia



Scale: 1 inch to 4 mile

Figure 1 Map of Inlay Lake (Source: Myanmar Survey Department, Yangon)



Plate I Inlay Lake



A. Triangular push net



B. Bamboo trap

Plate II Fishing gears



A. Measuring the location in the lake used with GPS



B. Measuring the water quality



C. Preparation for transporting the ornamental fish



D. Fish keeping aquaria

Plate III Taking the essential measurements during the study trip



A. *Sawbwa resplendens*
Annandale, 1918



B. *Inlecypris auropurpureus*
(Annandale, 1918)



C. *Microrasbora erythromicron*
Annandale, 1918



D. *M. rubescens*
Annandale, 1918

Plate IV Some of the studied species



A. Various species of dried ornamental fish in the market



B. Sun drying ornamental fish

Plate V Misused of ornamental fish in Inlay Lake