A STUDY ON LOCAL ORNAMENTAL FISH SPECIES OF DHEMAJI DISTRICT , ASSAM

A dissertation submitted in partial fulfillment of the requirement for the degree of Master of Science in Zoology

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(2022)

CERTIFICATE

This is to certify that the dissertation entitled " A STUDY ON LOCAL ORNAMENTAL FISH SPECIES OF DHEMAJI DISTRICT , ASSAM " submitted in partial fulfillment of the requirement for the degree of Master of Science in Zoology is a compilation of the result of bonafide work carried out by Jupi Talukdar (Reg. no : 451128220 , Roll no : 202820024010) , department of ZOOLOGY , Silapathar science college affiliated by ASSAM SCIENCE AND TECHNOLOGY UNIVERSITY , Assam under my guidance and supervision .

The dissertation or any its part has not been submitted elsewhere for any other degree of distinction in any other university / institution . All the help and assistance received during the course of work have been duly acknowledged .

I am pleased to forward this dissertation for consideration for the award of the degree of Master in Science in Zoology (Under Silapather science college) affiliated by ASSAM SCIENCE AND TECHNOLOGY UNIVERSITY , Assam .

(Dr . Jashodeb Arjun)

Date : 23-07-2022

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CANDIDATE' S DECLARATION

I , Jupi Talukdar , hereby declare that the research work entitled " A STUDY ON LOCAL ORNAMENTAL FISH SPECIES OF DHEMAJI DISTRICT , ASSAM " in partial fulfillment of the requirement for the degree of Master of Science in Zoology is being presented in the form of thesis and submitted in the department of Zoology , Silapathar Science College affiliated by ASSAM SCIENCE AND TECHNOLOGY UNIVERSITY , Assam , under the supervision of Dr. Jashodeb Arjun , associate professor .

The matter presented in the project has not been submitted by me for any other degree of this or any other institute .

Signature of the Candidates

This is to certify the above statement made by the candidate is correct to the best of my knowledge .

Date : 23-07-2022

Signature of supervisor

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CONTENT

INTRODUCTION

Ornamental fish means any species of aquatic animals that are reared or market for their beauty or exotic characteristics, rather than for consumption or recreational use. Ornamental fishes usually mean attractive colourful fishes of different characteristics or of various pattern.

Fishes are the most ancient and most numerous among the vertebrates comprising about 30000 species with global distribution. They live I in every conceivable type of aquatic habitat and exhibit great variation in size ,shape ,colour and behaviour. Apart from forming an important item of human diet, since the down of human civilization they also occupied and important part in our lives for their sporting and aesthetic cheerful and fascinating among the aquatic creature and it is no wonder that they find a place in many household and different public places as decorative item. (Das and Biswas ,2005) .

Ornamental fishes form an important commercial component of aquaculture providing for aesthetic requirement and up keep of the environment. Ornamental fishes are kept as pets in confined spaces like aquarium or a garden pool for fun and fancy but this living jewels need not always have bright colors as sometimes

their peculiar characteristics such as body colour morphology, mode of taking food etc many also add to their attractiveness.

In India the north eastern region is one of the major hot spot for ornamental fish diversity in the world (kottelat and whiten 1996) including 32 ornamental fish species are available in the upper Assam district like Tinisukia ,Dibrugarh ,Sivasagar and jorhat (pandey et.al 1998). Total 87 potential ornamental fish species are available in the state of Assam (bhattacharjya et Al .2000.

Out of 217 fish species recorded in Assam 150 fish species have good ornamental value (bhattacharjya et.al 2003) those species are high demand in international market. Assam is gifted with many extensive water bodies commonly known as beels that are the only source of fish for the poor people in the surrounding villages beels are major fishery resources contributing to about 25% of the production in Assam. Detail study of ornamental fish population of the wetland can help us to determine the present productivity or the status of wetland . keeping those in view an attempt has been made to study on the diversity of an ornamental fish species in and around Dhemaji district ,Assam .

Fishery Science and Agriculture is the sunshine sector of Indian Economy which provide livelihood to the economically backward population and has immense potential to earn foreign currency. Ornamental fishes usually mean attractive colorful fishes with various characteristics. Assam is blessed with the presence of mild climate and this influences abundance of

ornamental fishes in nature. This North-eastern state contributes the lion's share of total ichthyospecies of India. However there are vast unexplored potential for indigenous ornamental fishes in Assam. Scientific & systematic exploration will definitely ensure a significant place for Assam state in the sphere besides employment generation & earning of foreign exchange.

All along the focus of aquaculture lies in the production of food fish. However, aquaculture for recreational purpose is emerging with increased purchasing power of people the world over. Thus ornamental fish culture emerged as one of the fastest emerging sector in aquaculture to cater to needs of fish hobbyist. The entire global industry has been estimated to be worth around US$15 billion (FAO, 2013). India's domestic ornamental fish trade is reportedly growing at the rate of 20% annually. Major chunk of ornamental fishes from India to International market are exported via Kolkata Airport, of which the lion's share is contributed from North Eastern region. Nearly, 95% of our exports of freshwater ornamental fishes are based on wild collection of indigenous fishes from eastern, northeastern states and Western Ghats of the country. More than 150 species are reported to have ornamental value. Indiscriminate capture of these fishes from natural habitat using destructive fishing methods has led to decline in population of these fishes. Though sporadic attempts have been made to breed some of these species in captivity, not much success has been achieved. Still lot of data is required to formulate strategies to initiate captive breeding programmes of these endemic species on large scale.

OBJECTIVES

1. To study diversity of local ornamental fishes.
2. Potential for economic growth.
3. Production of ornamental fish for aesthetic appeal.
4. To promote export market of ornamental fish produced by small scale breeders.

REVIEW OF LITERATURE

- The most important contributor to the art of fish keeping was the Chinese. Goldfish were the first ornamental fish to be kept. These fish data back to 960AD during the sung dynasty in China .ponds stocked with ornamental fish gained popularity among the rich from 968-975 BC and eating the fish was strictly prohibited.

- In 1869 a French ship with valuable shipment from China arrived in Paris , she brought paradise fish a species of fabulously colourful fish in a barrel .This is how aquarium fish spread all over the Europe .

- The latest study on Native ornamental fish of northeast conservation concerns in Assam's Lakhimpur district by Bikul Goswami he has published his work in 2019 October 22 by NE NOW NEWs . Bikul Goswami studying and documenting the ornamental fish species for the last three decades .In his work he explained the challenges face by the native ornamental fishes and their trades.

- Ornamental fish diversity across Brahmaputra valley of Assam by Chandrasudha Goswami and V..S zade .They give a brief account of ornamental fishes in the region of Brahmaputra plain .

- Bordoloi R et al , hase done a detailed study on SIF present in majuli and given a detailed decription and number of fishes and Biodiversity conservation status of small indigenous fish present in this region . *During their study period they were encountered 55 species belonging to 7 orders and 19 families. Maximum diversity is observed in the family Cyprinidae which represents 18 species (32.72%) followed by Channidae 6 species, Belontidae and Chacidae each 4 pecies (7.27 %), Chandidae and Siluridae each 3 species (5.45 %), Cobitidae, Nandidae, Notopteridae and Mastercembelidae each 2 species (3.63 %), Anguillidae, Anabantidae Heteropneustidae, Gobiidae, Synbranchidae, Siluridae, Claridae, Schilbeidae, Chacidae and Tetradontidae each 1 species (1.81%). According to IUCN red list category, out of 55 species, 41.8 % species are not ealuated (NE), 36.36 % species are least concern (LC), 10.9 % species are near threatened (NT), 5.45 % species are vulnerable (VU) , 3.63 % lower risknear threatened (LRnt) and 1.81% species data deficient (DD) .*

- In 2018 a article published namely ornamental fish diversity in the Jiadhal river district of Dhemaji . They found the different species of fishes and give a detailed account of preservation and collection of those fishes.

- Potential indigenous ornamental fish species of NE region of India . A process development in 2012 gives brief introduction about the Indian scenario of ornamental fish farming and their breeding methods.

- Conversation and management of ornamental fish resources of northeast India . journal of aquaculture , describe about the conservation and management of potential ornamental fishes of northeast.

- A study on ornamental fish species Dhing area Nagaon Assam published on December 2017 by Kumar k et al, , Another paper on ornamental and icthyoffaunal diversity of North Guwahati by Guwahati University . emphasis on the potential ornamental fishes of North Guwahati region .

MATERIALS AND METHOD

Study area : -

Assam is located in the latitude 26.2006' N and longitude 92.9376' E and it is surrounded by hills and mountains on its three sides . The state of Assam has n area of 78,438 km representing 2.39% of the Indian land mass . Dhemaji is located at the northeastern corner of Assam (27.4811' N , 94.5573' E) . The district is spread over 32 37 square kilometre and lies on the elevation of about 104 m. River Brahmaputra passes through the south and East of dhemaji, the state of Arunachal Pradesh is to its North. Dhemaji is highly flood prone area . The major water bodies of dhemaji are Jiadhal / kumatiya, Gainadi , Moridhal , Dimow, Simen etc .

The study sites are : -

1. **Gainadi river**
2. **Jiadhal river**
3. **Telijan river**

DIVISION OF STUDY AREA

1.STUDY AREA (1) : JIADHAL

The river jiadhal is one of the sub tributary of the river Brahmaputra originated from Himalayan mountains of Arunachal Pradesh at an altitude of 1247m above the sea level .

The physio-chemical parameters of Jiadhal river are summarize as below : –

1.Temperature : - Average temperature recorded 20 °C

2.Transparency : – The average minimum transparency recorded 13.56cm during our survey time . transparency of water was effected by number of factors,both the dissolve and suspended Material Can influence water transparency.

3. pH - The average Recorded ph was 7.3. the pH value of natural water bodies was changes due to biological activity, any alternation of PH can effect the aquatic organism.

4.Dissolved oxygen : - Dissolved oxygen is a very important parameter of water quality and a index of physical and biological process on in water. In the study time the average dissolved oxygen was recorded 6.55 mg/l the variation of the dissolved oxygen label depend on primary production and respiration of aquatic organism present in the water.

5.Total Alkalinity -alkalinity is a total measure of substance in water that has acid neutralizing capacity.

The average alkalinity was recorded around 37.33 mg/litre . Surface alkalinity may result from waste discharge from nearby surface area. The main source of natural alkalinity are rocks which contain carbonate , silicate ,and phosphate may also contribute to alkalinity .

Fig : - Map showing Jiadhal river of Dhemaji

2. STUDY AREA (2) : **Gainadi**

Gainadi river is in sissiborgaon ,dhemaji . It is in 10km distance from silapathar .(27.33'42"N .94.29'34"E)

1. Temperature =average temperature recorded 25°

2. Transparency = 10.77cm

3. Ph -=7.3

4. Dissloved oxygen=-6.20mg /l

5 . Total alkalinity=3.5mg/l

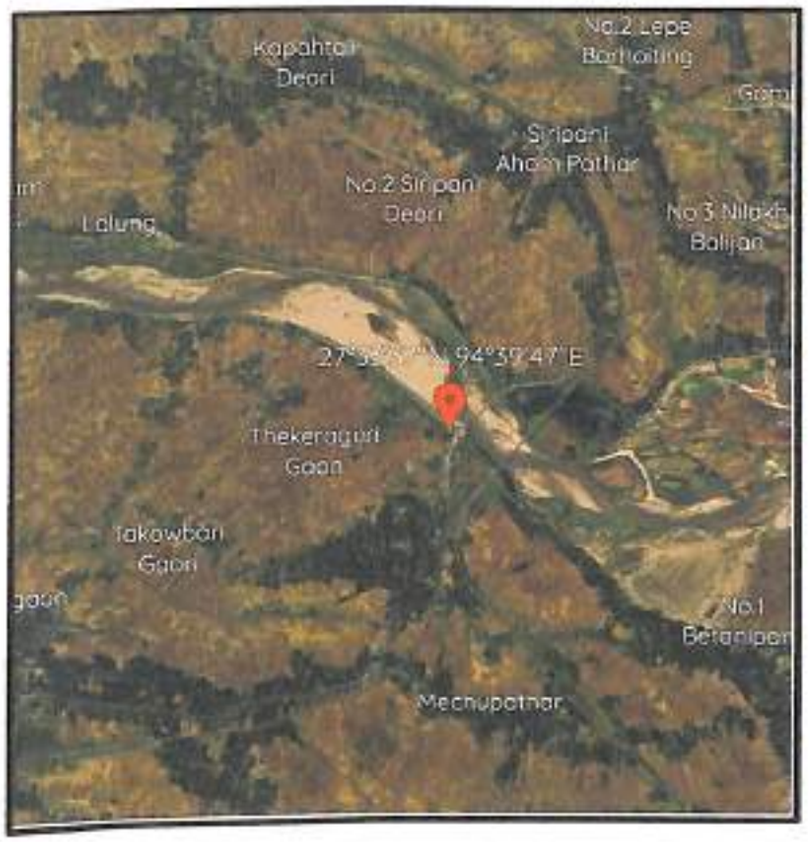


Fig : - Map showing Gainadi river of Dhemaji

3. Study area 3: **Telijan**

(27.27'14"N ,94 .33'19"E)located near Dhemaji town . We visited Telijan pathar vallage , and interacted with local fishermen .

1. Temperature = 26 ° C
2. Transparency = 6cm
3. Ph= 7.5
4. Dissolved oxygen = 6.50mg/l
5. Total alkalinity = 34.5mg/l

Fig : - Map showing Telijan river of Dhemaji

METHODOLOGY

To study of the ornamental fish species of the Dhemaji district area in the rivers name Gainadi , Jiadhal and Telijan river were studied during the period starting from April to June 2022. Fish sample were collected throughout this month from the rivers. The fishes were collected with the help of skilled local fisherman by using various fishing gears like cast net ,Dip net , langi net ,sip net ,Gill nets, hook and line etc .

Survey was conducted by active searching and trial guided by local people especially fisherman in this region. Survey was done during morning hour and evening also. The fish species were also collected from the local market of Dhemaji district survey areas during our visit . Photograph of those fishes and identify the fish species. The identification of fishes are done by internet (Google lens) and with the help of my guide. On the other hand the secondary informations was gathered through the local fisherman and experienced person in this field .The latest scientific names of the fish species were followed with the website www.fishbase and also photographs are taken by digital camera . The list of collected fish species with their IUCN status discuss below in result section.

RESULT

The collected fish here kept in glass jar for identification as well as took photographs to study their morphology by following a standard procedure. The fishes mainly collected from jiadhal ,Gainadi ,Telijan. Description of the fishes are given below -

Scientific Name	Family	Order	Local name	IUCN
1.Notopterus notopterus	Notopteridae	Osteoglossiformes	Kanduli	DD
2. Macrognathus	Mastacembelidae	Symbranchiformes	Tura	LR-nt
3. Rosbora daniconius	Danionidae	Cypriniforems	Danikana	LC
4. Puntius sophore	Cyprinidae	Cypriniformes	Puthi	LC
5. Trichogaster lalius,	Osphronemidae	Beloniformes,	Ronga khalihona	LR-nt
6. Systomussarana	Cyprinidae	Cypriniformes,	Seneeputhi	VU
7. Salmophasia bacaila	Danionidae	Cypriniformes,	Selekona	LC
8. Botia Dario	Botiidae,	Cypriniformes	Gethu(koina)	LC
9. Glossogobius giuris	Gobiidae	Perciformes	Patimutura	LC
10. Tetradon cutcutia	Tatraodontidae	Tetraodontiformes	Gangatop	Yet to be assessed

11. *Channa gachua*	channidea	anadantiformes	Chengeli	LC
12. *Rasbora daniconius*	Danionidae	cypriniformes,	Darikana	LC
13. *Pethialicto*	Cyprinidae	Cypriniformes,	Chakariputhi	LC
14. *Lepidocephalichthys guntea*	cobitidae	Cypriniformes ,	Botia	Yet to be assessed
15. *Mystus bleekeri,*	Bagridae	Siluriformes,	Singora	LC
16. *Ompok pabda*	siluridae	Siluriformes,	Pavo	NT
17. *Nandus nandus*	Nandidae	Perciformes,	Gedgedi	LC
18. *Anabus testudineus*	Anabantida	Perciformes	Kawoi	LC
19. *Polyacanthus fasciata*	Osphronemidae	Perciformes,	Kholihona	LC
20. *Trichogaster chuna,*	Osphronemidae	Perciformes,	Vechell	LC
21. *Devario devario*	cyprinidae	cyprinae	Bora	VU
22. *Xenentodon cancila*	Belonidae	Beloniformes,	kakila	LR-nt
23. *Carassius auratus*	cyprinidae	Cyprinydformes	Golden carp	LC
24. *Phalacronotus bleekeri,*	siluridae	Siluriformes	kajoli	NE

(En-Endangered; VU-Vulnerable, LR-nt :- Lower risk near threatened, LR-lc- Lower risk least concern, NE- Not evaluated.)

Table 1:-

The number of Order of fishes : -

Order name	Number of Order
Siluriformes	3
Cypriniformes	10
Beloniformes	2
Perciformes	5
Anadantiformes	1
Tetraodontiformes	1
Synbranchiformes	1
Osteoglossiformes	1

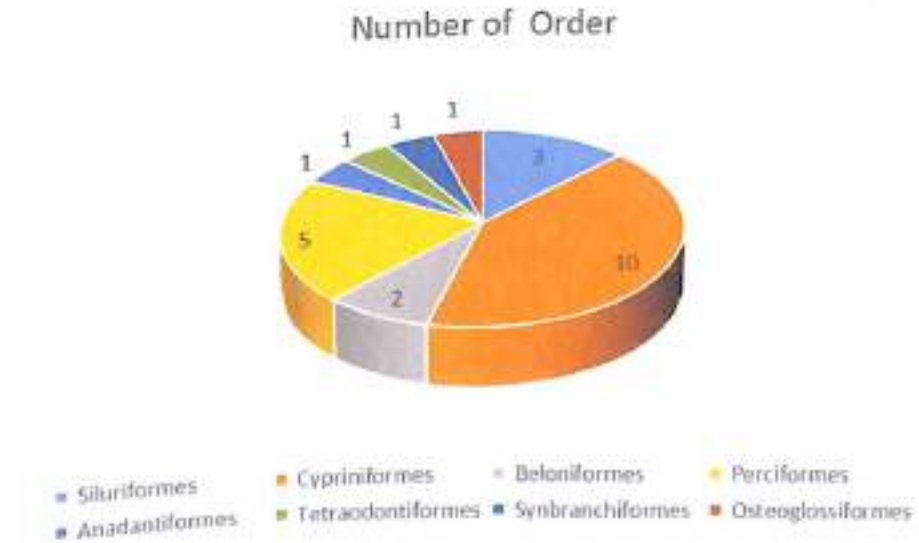
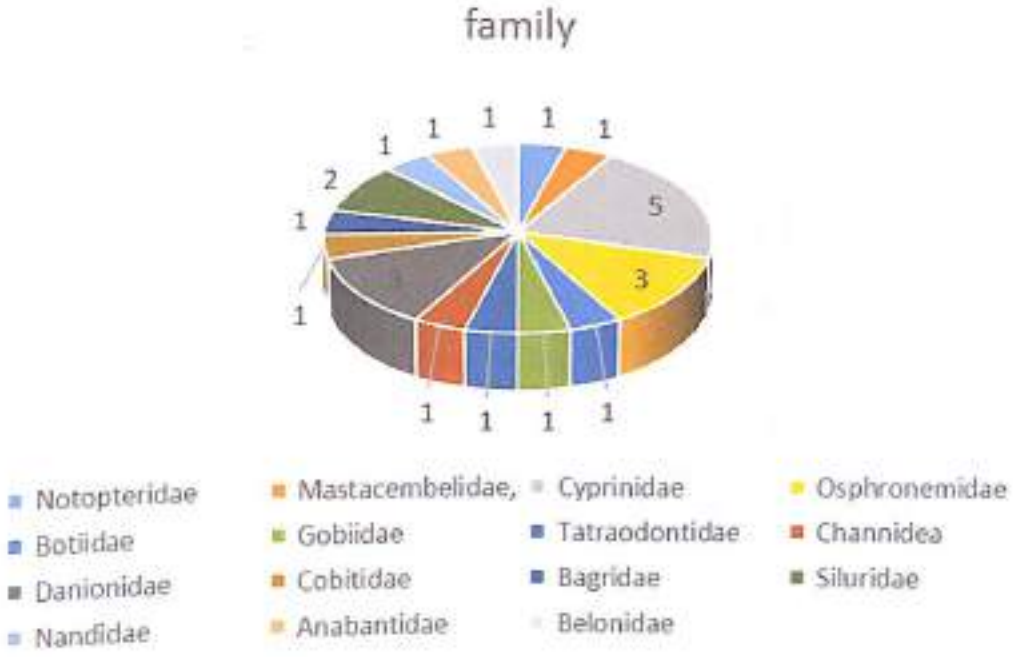


Table 2 : -

Number of order of fishes : -

Name of family	Number of family
Notopteridae	1
Mastacembelidae.	1
Cyprinidae	5
Osphronemidae	3
Botiidae	1
Gobiidae	1
Tatraodontidae	1
Channidea	1
Danionidae	3
Cobitidae	1
Bagridae	1
Siluridae	2
Nandidae	1
Anabantidae	1
Belonidae	1


family
1
1
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5
3
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2
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1
Notopteridae
Botiidae
Danionidae
Nandidae
Mastacembelidae,
Gobiidae
Cobitidae
Anabantidae
Cyprinidae
Tatraodontidae
Bagridae
Belonidae
Osphronemidae
Channidea
Siluridae

Photographs of collected ornamental fish species :-

Fig : - Anabus Testudineus

Fig : puntius sophore

Fig : - Macorgnathus

Fig : ompok pabda

Fig :- *Channa gachua*

Fig :- Chalacronotus bleekera

Fig : - trichogaster chona

Fig : Notopterus notopterus

Fig :-amblyphahyngdon mole

Fig : - nandus nandus

Fig : - rosbora daniconius

Fig :- glossogobaus giuris

Fig : carassius auratus

Fig : mystus bleekeri

Fig :lepidocephalichthus guntea

DISCUSSION

It is found that Dhemaji District specially the river areas of jiadhal ,gainadi and teljan harbours a great variety of ornamental fish species. After the completion of the study a total of 24 species have been recorded from the areas of study. . There availability also noted. The major threat faced by the native ornamental fishes in this region is formed natural calamities like flood and earthquake. Human interference in nature and destruction of national ecosystems by using nylon net for fishing, poisoning of water bodies by using chemical products , blasting and deforestation have been frequently done in all major natural water bodies of the district stretching from the hills of Arunachal Pradesh. The uncontrolled use of pesticides and inorganic fertilizers in agriculture field of the district has also cause great harm to the ornamental fishes among all other things. And also decrease the population of potential native ornamental fishes in this areas.

In a bid to preserve and promote the native ornamental fishes we must have been relentlessly working for captive breeding of the exotic species. We also promote the indigenous medicinal herbs for the management of ornamental fish diseases. Also work on Immune modulation , quarantine the disease fishes , observing the behaviour of the fishes in captivity, artificial feeds, maintaining the proper coloration of the fish in captivity in the aquatic facility . Ornamental fishes has high potential for the export market and they can be conserve through captive breeding.

After completion of the study a total of 24 species belonging to 15 families and 8 orders have been recorded from the study area . It has been observed that among the families *Cyprinidae* family was the most dominant, which includes both 5 species . Next followed by the *Osphronemidae* and *Daionidae* family with 3 species .

So far I have listed *puntius sophore* , *salmophosia bacaila* , *channa gacha* , *puntius ticto* , *lepidocephalichthys guntea* , *ompak pabda and polyacanthus fasciata* are the exotic native ornamental fish species found in Dhemaji district .

In the threatened species red list of IUCN (2011), there are a total of 14 species listed under least concern (LC) category, 1 species under not evaluated (NE) category, 1 species under near threatened (NT) category and 1 species under data deficient (DD) category , 3 species under lower risk near threatened , 2 species under yet to be assessed and 3 species under vulnerable .

As per Ornamental Fish Aquarists Welfare Association, Kolkata, presently around 150 species of indigenous small fishes are being exported to Japan, Hong Kong, Thailand and Singapore through Kolkata as ornamental fish. These fishes are collected from wild mainly from Assam though these are also available in rest of the north eastern states including North Bengal.

Developmental approach

• Implement an ecosystem-based approach for fisheries, based on scientific data, that includes zoning the streams, rivers, lakes and other wetlands (Fishing zone, no

fishing zones, sanctuaries; banning destructive fishing (e.g., pesticide, bleaching, electric fishing and dynamite);.

• Determine biodiversity and population status and trends with indicators that diagnose and manage declines with sufficient resources based on scientific assessments like of size limits, maximum sustainable yield.

• Implement restrictions on harvest of overexploited species to maintain sustainability.

• Promote economic and societal benefits from conservation through education.

• Regularization and licensing exports of aquarium fish taken from captive breeding programs or areas effectively managed for conservation.

• Encourage research in public-private sector by linking government agencies with supporting ornamental fish farmers .

- Institutional support and efforts for breeding, rearing and promotion of trade of indigenous ornamental fishes need to be intensified to facilitate growth in this segment

•Guidelines on collection and trade for green certification of native ornamental fishes are to be developed

CONCLUSION

The present study is the documentation of potential ornamental fish species from the Dhemaji district assam who is exhibit a good number of ornamental fishes. The illegal fish capturing method for food are the major cause of depletion of ornamental fishes So, for conservation of living jewels of aquatic world a long term and effective management plan should be adopted to control the fishing and exported trade. Further works particularly in the following areas will yield valuable results and finding in determining detailed status of freshwater ornamental fish and will very much helpful in conservation of these valuable species.

Conserving the native ornamental fishes through captive breeding has the great potentiality of creating a global market , and northeast specially Assam taking a leading role in the ornamental fish export market.

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