

A study on the
THREATENED AND ENDEMIC FISHES
OF NORTH BENGAL, INDIA

with a discussion on
the potential impact of climate change on them



R. P. Barman
A. Das

ZOOLOGICAL SURVEY OF INDIA



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IMPACT OF CLIMATE CHANGE ON THEM**

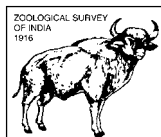
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INTRODUCTION

North Bengal is a part of West Bengal. Historically, the River Ganga divides the state of West Bengal into South and North Bengal. The North Bengal is also divided into Terai and Duars region. The Terai (“moist land”) is a belt of marshy grasslands, savannas and forests at the base of the Himalaya range in India, Nepal and Bhutan from the Yamuna River in the west to the Brahmaputra River in the east. The Duars are flood plains at the foothills of the eastern Himalayas in North-East India around Bhutan. North Bengal consists of the districts of Cooch Behar, Darjeeling, Jalpaiguri, North Dinajpur, South Dinajpur and Malda together. Jalpaiguri, Darjeeling, Dinajpur and Cooch Behar lies at the foothill of the great Himalayas. The area covers the moist and dense riverine forests of the Bengal Duars and the stark foothills of the snow-capped Kanchenjunga range. Darjeeling and Kalimpong, is a rugged strip of vertical mountainous area occupying an area of just 90 km wide and 150 km deep. The grain of this region rises from near sea level to 8500 meters. The climate varies between the tropical heat of the valleys and the alpine cold of the snowy regions. It is the most humid region of the Himalayas with an average rainfall of 346 cm. The unique climatic and ecological conditions make North Bengal a unique home for a wide variety of fauna. An attempt was undertaken to explore the fish fauna, especially the threatened and endemic species of this region.

The present study is primarily aimed at examining the threatened and endemic fish species occurring in North Bengal. The fish of our country especially the freshwater fishes are now under threats due to various factors. The chief factors of threats are habitat loss and degradation (in the form of deforestation, damming the rivers systems, shrinkage of wetland and urbanization), overexploitation, pollution, indiscriminate fishing and introduction of the exotic species in our water bodies. The newly added threat factor is the global warming leading to climate change and loss of biodiversity which run in both ways. North Bengal contains numerous cold water fishes. These cold water fishes are very sensitive to change in water temperature. Human activities already have pushed several fishes to the brink of extinction. With added stress of global warming the impact on the freshwater aquatic animals, especially the cold water fish species could be devastating. The likely effect is slower growth rate, lower oxygen level in the water bodies, greater susceptibility to pollutants, parasites and disease.

The conservation of habitat of the fish species, monitoring and control of overexploitation of the fishes, environment impact assessment of the exotic fish species must be conducted before their import or total prohibition on the introduction of exotic fish species since it is not at present necessary. Monitoring on pollution of the natural water bodies, prohibition of indiscriminate fishing, strict implementation of the laws governing the fishing operation, is also



Fig.1. Political Map of North Bengal showing the river drainage (Source: Maps of India)

needful. Besides these, to increase the climate change mitigation and adaptation options to control global warming and climate change, conservation of the biodiversity and lastly setting up of fish sanctuaries in all the states of our country are some of measures suggested to protect and conserve the threatened, endemic and native species of India (Barman, 2010).

A major part of North Bengal is covered by hilly areas. There are numerous scattered upland water bodies in the mountainous region of this region. The distributional pattern of the Fish species of North Bengal indicates that majority of the species of West Bengal including several threatened, endemic and unique species is found in the North Bengal owing to have several unique habitats and ecological conditions. Considering the presence of majority of the species having a number of the threatened, endemic and interesting species in North Bengal, this region has been described as the 'Hot Spot' of the Fish resource of West Bengal (Barman, 2007). An analysis of the fish species of this region shows that many exotic fish species are found here (Barman, op. cit). It also shows that a large number of fishes of this region are cold water species.

Our present study has identified 63 threatened species and endemic species belonging to 49 genera, 19 families and 7 orders occurring in the freshwater bodies of North Bengal. The present study has also identified 16 endemic fish species in this region. The systematic list of the Fishes of West Bengal has been followed as per that of Jayaram (1999 and 2006). During this study the fishes of the River Ganges and its branches (Hamilton, 1822) and the fishes of North Bengal (Shaw and Shebbeare, 1937) and Menon (1999 & 2004) were consulted. Since the name of the species in Bengali is not uniform everywhere and confusing also, the name of the species in English have also been provided after the name of each species wherever known. The outlined drawings / photographs of the threatened and endemic species have been provided for the easy identification of these fishes in this paper.

MATERIALS AND METHODS

Two faunistic surveys were undertaken to observe the status of the threatened and endemic species occurring in the freshwaters of North Bengal in 2008 and 2010 covering some of fish catchment areas and landing centres. The specimens collected during these surveys have been deposited to the National Zoological Collection at the Division of Fishes of Zoological Survey of India, Kolkata. All the specimens examined in this study have been included under respective materials examined category. The number of specimen(s), standard length (SL), name of locality, date of collection and name of collector documented. It may be mentioned here that the intended survey could not be properly undertaken due to long lasting local disturbances particularly in the hilly districts of North Bengal. Our acquired knowledge and experience over North Bengal indicate that if North Bengal particularly the hilly districts are thoroughly surveyed many more interesting results are likely to be found.

SYSTEMATIC LIST

Order I: OSTEOGLOSSIFORMES

Family 1: NOTOPTERIDAE

1. *Chitala chitala* (Hamilton, 1822) (Endangered)

Order II: ANGUILLIFORMES

Family 2: ANGUILLIDAE (Freshwater Eels)

2. *Anguilla bengalensis bengalensis* (Gray, 1831) (Endangered)

Order III: CLUPEIFORMES

Family 3: CLUPEIDAE

3. *Goniolosa manmina* (Hamilton, 1822) (Vulnerable)

Order IV: CYPRINIFORMES

Family 4: CYPRINIDAE

4. *Aspidoparia jaya* (Hamilton, 1822) (Vulnerable)
5. *Bangana dero* (Hamilton, 1822) (Vulnerable)
6. *Barilius barila* (Hamilton, 1822) (Vulnerable)
7. *Barilius howesi* Barman, 1986 (Endangered) (ENDEMIC)
8. *Bengala elanga* (Hamilton, 1822) (Endangered)
9. *Chagunius chagunio* (Hamilton, 1822) (Endangered)
10. *Crossocheilus latius* (Hamilton, 1822) (Vulnerable)
11. *Cyprinion semiplotum* (McClelland, 1839) (Vulnerable)
12. *Danio dangila* (Hamilton, 1822) (Vulnerable)
13. *Danionella priapus* Britz, 2009 (ENDEMIC)
14. *Garra gotyla gotyla* (Gray, 1832) (Vulnerable)
15. *Labeo nandina* (Hamilton, 1822) (Vulnerable)
16. *Labeo pangusia* (Hamilton, 1822) (Vulnerable)
17. *Neolissocheilus hexagonolepis* (McClelland, 1839) (Endangered)
18. *Oreochthys crenuchoides* Schafer, 2009 (ENDEMIC)
19. *Poropuntius clavatus* (McClelland) (Vulnerable)
20. *Systomus sarana* (Hamilton, 1822) (Vulnerable)
21. *Raiamas bola* (Hamilton, 1822) (Endangered)
22. *Schizothorax richardsonii* (Gray, 1832) (Vulnerable)

23. *Tor putitora* (Hamilton,1822) (Endangered)

24. *Tor tor* (Hamilton,1822) (Endangered)

Family 5: BALITORIDAE

25. *Aborichthys elongatus* (Hora1921) (Endangered) and (ENDEMIC)

26. *Schistura devdevi* (Hora,1935) (Endangered)

27. *Schistura multifasciatus* Day1878 (Vulnerable)

Family 6: COBITIDAE

28. *Botia almorae* Gray (Vulnerable)

29. *Botia dario* (Hamilton, 1822) (Vulnerable)

30. *Pangio apoda* Britz & Maclaine, 2007 (ENDEMIC)

31. *Pangio pangia* (Hamilton, 1822) (Vulnerable)

Order V: SILURIFORMES

Family 7: BAGRIDAE

32. *Batasio fasciolatus* Ng, 2006 (ENDEMIC)

33. *Sperata aor* (Hamilton, 1822) (Vulnerable)

Family 8: SILURIDAE

34. *Ompok pabda* (Hamilton, 1822) (Vulnerable)

35. *Ompok pabo* (Hamilton, 1822) (Endangered)

Family 9: SCHILBEIDAE

36. *Clupisoma garua* (Hamilton, 1822) (Vulnerable)

37. *Eutropiichthys vacha* (Hamilton, 1822) (Vulnerable)

38. *Silonia silondia* (Hamilton, 1822) (Vulnerable)

Family 10: PANGASIIDAE

39. *Pagasius pangasius* (Hamilton, 1822) (Vulnerable)

Family 11: AMBLYCIPITIDAE

40. *Amblyceps cerinum* Ng & Wright,2010 (ENDEMIC)

41. *Amblyceps mangois* (Hamilton, 1822) (Endangered)

Family 12: SISORIDAE (Sucker catfishes)

42. *Bagarius bagarius* (Hamilton, 1822) (Vulnerable)

43. *Glypthorax cavia* (Hamilton, 1822) (Endangered)

- 44. *Glyptothorax indicus* Talwar 1991 (Vulnerable)
- 45. *Glyptothorax telchitta* (Hamilton, 1822) (Vulnerable)
- 46. *Nangra nangra* (Hamilton, 1822) (Vulnerable)
- 47. *Parachiloglanis hodgarti* (Hora) (Vulnerable)
- 48. *Pseudecheneis sulcata* (McClelland, 1842) (Vulnerable)
- 49. *Sisor rhabdophorus* Hamilton, 1822 (Endangered)

Family 13: ERETHISTIDE

- 50. *Erethistes sicala* Ng, 2005 (ENDEMIC)
- 51. *Hara horai* Misra, 1976 (Endangered)
- 52. *Pseudolaguvia ferruginea* Ng, 2009 (ENDEMIC)
- 53. *Pseudolaguvia ferula* Ng, 2006 (ENDEMIC)
- 54. *Pseudolaguvia foveolata* Ng, 2006 (ENDEMIC)
- 55. *Pseudolaguvia shawi* Hora, 1921 (Endangered)

Family 14: CHACIDAE

- 56. *Chaca chaca* (Hamilton, 1822) (Endangered)

Family 15: OLYRIDAE

- 57. *Olyra longicaudata* McClelland, 1842 (Vulnerable)

Order VI: MUGILIFORMES

Family 16 MUGILIDAE

- 58. *Rhinomugil corsula* (Hamilton, 1822) (Vulnerable)
- 59. *Sicamugil cascasia* (Hamilton, 1822) (Vulnerable)

Order VII: PERCIFORMES

Family 17: BADIDAE

- 60. *Badis badis* (Hamilton, 1822) (Vulnerable)

Family 18: OSPHRONEMIDAE

- 61. *Ctenops nobilis* McClelland, 1845 (Vulnerable)

Family 19: CHANNIDAE

- 62. *Channa amphibeus* (McClelland, 1845) (Vulnerable)
- 63. *Channa barca* (Hamilton, 1822) (Vulnerable)

SYSTEMATIC ACCOUNT

Order I: OSTEOGLOSSIFORMES

Family 1: NOTOPTERIDAE (Feather backs)

1. ***Chitala chitala*** (Hamilton, 1822)
(Humped feather-back)

1822. *Mystus chitala* Hamilton, *Fish Ganges*: 236,382 (Larger freshwater rivers of Bengal).

2004. *Chitala chitala*: Menon, *Threatened fishes of India and their conservation*, **8**: 10.

Vernacular names: Chital (Bengali).

Materials examined: (i) 2 ex. 330-352 mm SL; Alipurduar, Jalpaiguri, North Bengal; R. P. Barman and party; 26.08.2008.

Distribution: India: Northern parts, Pakistan, Bangladesh and Mynmar.

Habitat and Biology:
Freshwater Rivers, lakes and beels. This species breeds in stagnant water or running waters in rainy season.

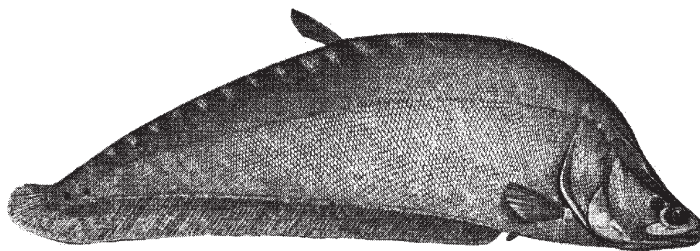
Maximum size: 122 cm TL.

Endemism: Not endemic.

Conservation status: Endangered (Lakra *et. al*, 2010).

Protective measures taken: No measures taken yet.

Recommendations: Overexploitation of this species should be controlled. Habitat loss and degradation of this species should be monitored and controlled wherever this species is available.



Order II: ANGUILLIFORMES

Family 2: ANGUILLIDAE (Freshwater Eels)

2. ***Anguilla bengalensis bengalensis*** (Gray, 1831)
(Indian mottled eel)

1831. *Muraena bengalensis* Gary, *Illus. Indian Zool.*, pl.95, fig.5 (the River Ganges).

1999. *Anguilla bengalensis*: Menon, *Rec. zool. Surv. India, Occ. Paper No. 175*: 5-6.

Vernacular names: Eel.

Materials examined (i) 3 ex., 320-365 mm SL; Alipurduar, Jalpaiguri, North Bengal; R. P. Barman and party; 26.viii.2008.

Distribution: India, Pakistan, Bangladesh, Sri Lanka, Myanmar, Malaya Archipelago and the Pacific.

Habitat and Ecology: Freshwater streams, pools, reservoirs and rivers descending to estuaries and to sea for spawning.

Maximum size: 120 cm. TL.

Endemism: Not endemic.

Conservation status: Endangered (Molur & Walker, 1998).

Protective measures taken: No measures taken yet.

Recommendations: This is one of the most common eels in Indian inland waters and of considerable commercial value particularly in the inland waters of the east coast of India and the Andaman islands. There is a good export market for this species. So, overexploitation of this species must be monitored and controlled.

Order III: CLUPEIFORMES

Family 3: CLUPEIDAE (Herrings, Sardines, Shads)

3. *Goniolosa manmina* (Hamilton, 1822) (Ganges river gizzard shad)

1822. *Clupanodon manmina* Hamilton Buchanan, *Fish Ganges*: 247 (Ganges).

1991. *Gonialosa manmina*: Talwar and Jhingran, *Inland Fishes of India and adjacent countries*, 1: 107-108.

Vernacular names: Khoira (Bengali).

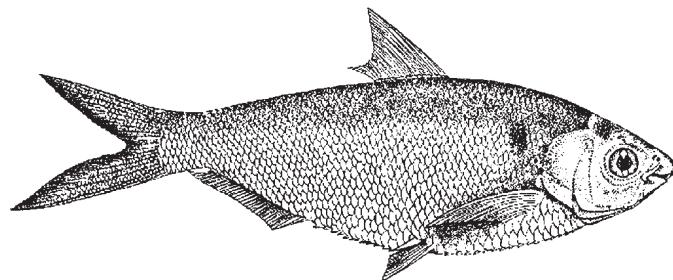
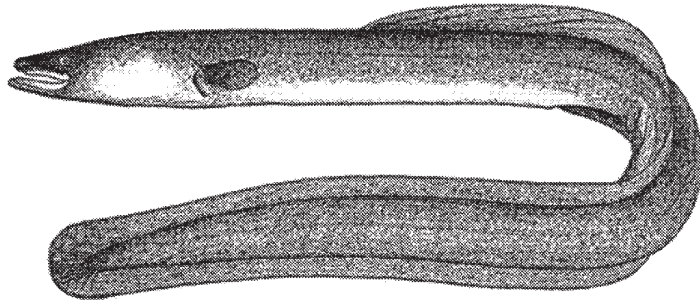
Materials examined: No specimen observed during the surveys. This species has been recorded from North Bengal by Shaw and Shebbeare (1937).

Distribution: India: Ganga, Jumuna and Mahanadi. Bangladesh.

Habitat and Ecology: Rivers and pools.

Maximum size: 11.5 cm SL.

Conservation status: Vulnerable (Lakra *et. al*, 2010).



Protective measures taken: No measures taken yet.

Recommendations: Over-harvesting and habitat alteration and degradation of this species are to be controlled.

Order IV: CYPRINIFORMES

Family 4: CYPRINIDAE (Minnows, Carps)

4. *Aspidoparia jaya* (Hamilton, 1822) (Aspidoparia, Jaya)

1822. *Cyprinus jaya* Hamilton, *Fish Ganges*: 333,392 (North Bihar).

1999. *Aspidoparia jaya*: Menon, *Rec. zool. Surv. India, Occ. Paper No. 175*: 10-11.

Vernacular names: Chola, Bariala.

Materials examined: No specimen was observed during the surveys. It was recorded by Shaw & Shebbeare, (1937) from North Bengal.

Distribution: India: Gangetic provinces, Assam. Nepal and Bangladesh.

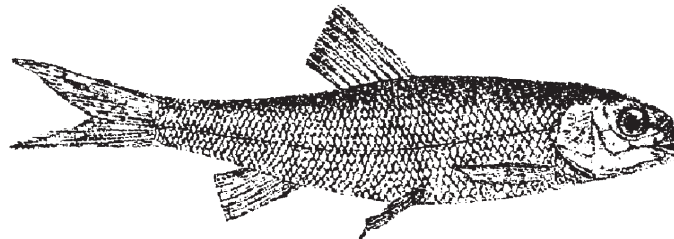
Habitat and Ecology:

Freshwater streams and ponds.

Maximum size: 102 mm TL.

Conservation status:

Vulnerable (Molur & Walker, 1998).



Protective measures taken: No measures taken yet.

Recommendations: A fish sanctuary is to be set up where this species occurs to protect it from extinction. Habitat loss and degradation of the water bodies where this species is found to be monitored and controlled to save and protect this species.

5. *Bangana dero* (Hamilton, 1822) (Kalabans)

1822. *Cyprinus dero* Hamilton, *Fishes of Ganges*: 277, 331,585, pl.22, fig.78 (Brahmaputra River).

2006. *Bangana dero*: Zhang and Chen, *Zootaxa*, **1281**: 50.

Vernacular names: Gardi.

Materials examined: (i) 1 ex., 90 mm SL; Tista River, Siliguri, North Bengal; R. P. Barman and party; 02.ix.2008.

Distribution: India: all along the Himalayas including Kashmir, Chota-Nagpur, Satpura-Vindhya ranges, Deccan and south as far as the Cauvery. Pakistan, Nepal and Bangladesh.

Habitat and Ecology: Mountain streams and rivers. It is a bottom feeder and cultivable in the hilly regions.

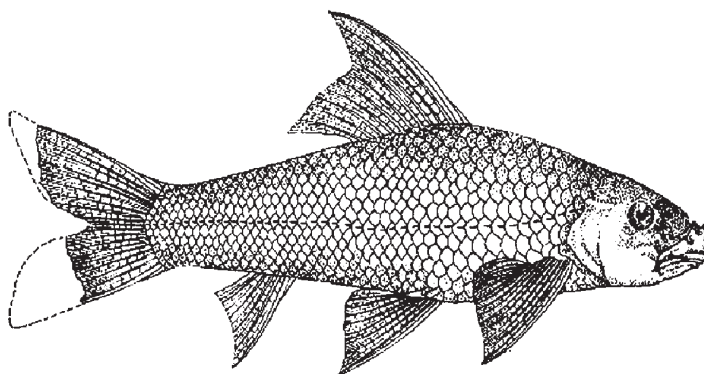
Maximum size: 75. Cm TL.

Endemism: Not endemic.

Conservation status: Vulnerable (Menon, 2004).

Protective measures taken: No measures taken yet.

Recommendations: Its population is declining due to



indiscriminate harvesting, use of explosives and pollution of the streams in the hilly regions of its occurrence. So, these should be stopped to protect them. Some of the deep water bodies in the course of rivers at the base of the Himalayas where this species occurs during the period of summer may be considered for the establishment of fish sanctuaries.

6. ***Barilius barila*** (Hamilton, 1822)
(Hill trout)

1822. *Cyprinus barila* Hamilton *Fish Ganges*: 267,384 (Rivers of Northern Bengal).

1999. *Barilius barila*: Menon, *Rec. zool. Surv. India, Occ. Paper No. 175*: 13.

Vernacular names: Gilland / Caedra.

Materials examined: (i) 1 ex., 68 mm SL; Torsa River, Cooch Behar, North Bengal; R. P. Barman and party; 28.viii.2008. (ii) 2 exs., 55-65 mm SL; Tista River, Jalpaiguri district, North Bengal; R. P. Barman and party; 31.viii.2008. (iii) 1 ex., 62 mm. SL; Tista River, Siliguri, North Bengal; R.P.Barman and party; 02.ix.2008.

Distribution: India, Nepal and Pakistan.

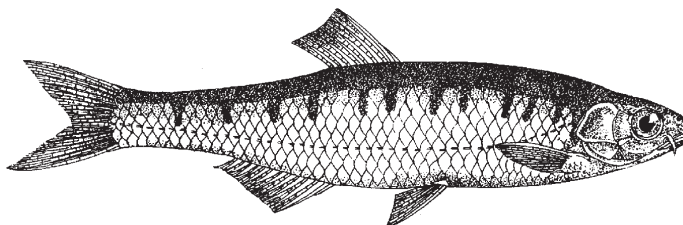
Habitat and Ecology: Hill streams and shallow clear water rivers with gravelly and rocky bed along foot hills.

Maximum size: 100 mm. TL.

Endemism: not endemic.

Conservation status: Vulnerable (Molur & Walker, 1998).

Protective measures taken: No measures taken yet.



Recommendations: Indiscriminate harvesting and over exploitation of this species should be prohibited. Hill streams or rivers where this species normally occurs may be considered for declaring fish sanctuary. Identification pamphlets should be made available to those who are concerned for its protection and conservation around its occurrence.

7. *Barilius howesi* Barman, 1986
(Hill trout)

1986. *Barilius howesi* Barman, *J. Bombay nat. Hist. Soc.*, **83**(1): 171-173 (Stream near Sulkapara, Jalpaiguri district, North Bengal in West Bengal).

2011. *Barilius howesi* Barman *et. al*, *Rec. zool. surv. India*, **111**(Part-1): 31-35, 2011

Vernacular names: Gilland / Caedra.

Materials examined: Holotype: ZSI FF 2235, 70 mm SL, Locality: stream near Sulkapara, Jalpaiguri district, North Bengal, Collector: Dr. H.K. Bhowmick, Date of Collection: 27.viii.1975; Paratypes: 2 ex., 61-66 mm SL. Reg. No. ZSI FF 2236. Locality, Collector and date of collection same as in holotype.

Distribution: India: So far known Jalpaiguri district, North Bengal only.

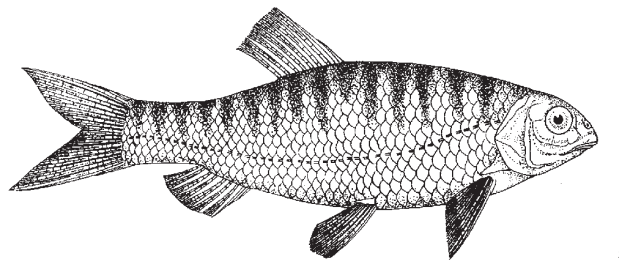
Habitat and Ecology: Hill streams.

Maximum size: I 70 mm SL.

Endemism: Endemic.

Conservation status: Endangered.

Protective measures taken: No measures taken yet.



Recommendations: Identification and information pamphlets should be distributed to those who are concerned for its protection and conservation around its occurrence. Indiscriminate harvesting and pollution of the water bodies where this species normally occurs should be prohibited. Hill streams or rivers where this species normally occurs may be considered for declaring fish sanctuary.

Remarks: This fish is hereby assessed as endangered due to its restricted distribution as well as restricted population.

8. *Bengala elanga* (Hamilton, 1822)
(Rasbora)

1822. *Cyprinus elanga* Hamilton, *Fish Ganges*: 281,386 (Rivers and ponds of Bengal).

1999. *Bengala elanga*: Menon, *Rec. zool. Surv. India, Occ. Paper No. 175*: 34.

Vernacular names: Nil.

Materials examined: No specimen was found during the surveys. It was recorded from North Bengal by Shaw and Shebbeare (1937).

Distribution: India: Assam and West Bengal. Bangladesh, Pakistan and Mynmar.

Habitat and Ecology: Rivers and ponds.

Maximum size: 15.0 cm TL.

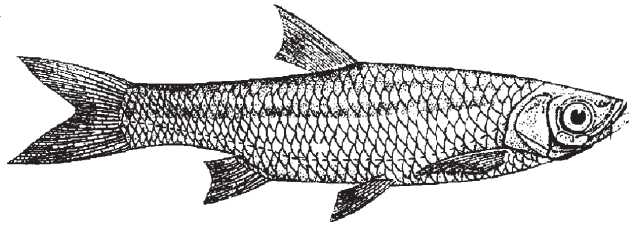
Endemism: Not endemic.

Conservation status: Endangered.

Protective measures taken: No measures taken yet.

Recommendations: A fish sanctuary is to be set up where this species occurs to protect it from extinction.

Remarks: This fish is hereby assessed as endangered due to its restricted distribution as well as restricted population.



9. *Chagunius chagunio* (Hamilton, 1822) (Chaguni)

1822. *Cyprinus chagunio* Hamilton, *Fishes of Ganges*: 295, 387 (Jamuna river and northern rivers of Bihar and Bengal).

2004. *Chagunius chagunio*: Menon, *Threatened fishes of India and their conservation*: 55-57.

Vernacular names: Jerruah.

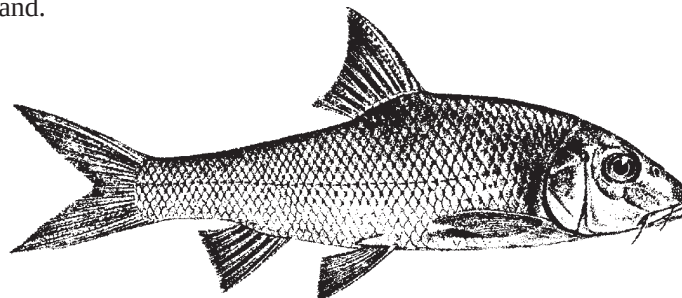
Materials examined: (i) 3 ex., 95-127 mm SL; Sankosh River, Kamakhaguri, Alippurduar, Jalpaiguri district, North Bengal; R. P. Barman and party; 27.viii.2008. (ii) 1 ex., 78 mm SL; Tista River, Jalpaiguri, North Bengal; R. P. Barman and party; 31.viii.2008. (iii) 1 ex., 97 mm SL; Darjeeling, North Bengal; R. P. Barman and party; 06.ix.2008.

Distribution: India: the Ganga, Brahmaputra and Damodar rivers. Nepal, Pakistan, Bangladesh, Myanmar and Thailand.

Habitat and ecology: Rivers with rocky bottom, clear and fast water and vegetation.

Maximum size: 12 cm TL.

Endemism: Not endemic.



Conservation status: Endangered (Lakra *et. al*, 2010).

Protective measures taken: No measures taken yet.

Recommendations: Suitable fast flowing streams in Dehradun district and in Assam should be selected in the Ganga and the Brahmaputra for the preservation of this species (Menon, 2004).

10. *Crossocheilus latius* (Hamilton, 1822) (Latia)

1822. *Cyprinus latius* Hamilton, *Fishes of Ganges*: 345, 393 (River Tista, North Bengal).

1999. *Crossocheilus latius latius*: Menon, *Rec. zool. Surv. India, Occ. Paper No. 175*: 140-141.

Vernacular names: Kalabatta.

Materials examined: (i) 1 ex., 95 mm SL; Pakurialata, Alipurduar., Jalpaiguri district, North Bengal; R. P. Barman and party; 25.viii.2008. (ii) 1 ex., 78 mm SL; Sankosh River, Kamakhaguri, Alipurduar, Jalpaiguri, North Bengal; R. P. Barman and party; 27.viii.2008. (iii) 1 ex., 97 mm SL; Torsa River, Cooch Behar, North Bengal; R. P. Barman and party; 28.viii.2008.

Distribution: India: the Ganga and Brahmaputra, along the Eastern Himalayas, Mahanadi drainage system in Orissa and Krishna drainage in Bombay Ghat portion of Western Ghats. Nepal.

Habitat and Ecology:
Mountain streams and rivers.

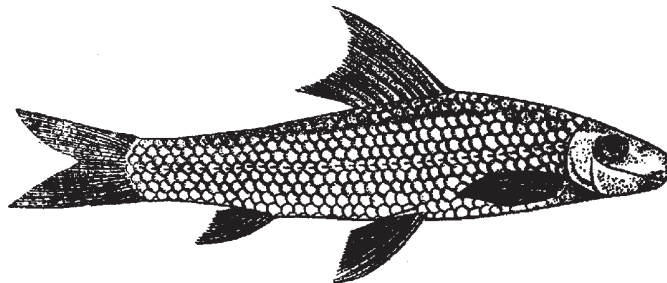
Maximum size: 12.4 cm TL.

Endemism: Not endemic.

Conservation status: Vulnerable
(Lakra *et. al*, 2010).

Protective measures taken: No measures taken yet.

Recommendations: Habitat alteration is to be prohibited and over-harvesting is to be controlled.



11. *Cyprinion semiplotum* (McClelland, 1839) (Assamese King Fish)

1839. *Cyprinus semiplotus* McClelland, *Asiat. Res.*, **19**: 274, fig. 2 (the Brahmaputra River in the upper Assam).

2004. *Cyprinion semiplotum*: Menon, *Threatened fishes of India and their conservation*: 95-97.

Vernacular names: Badangi.

Materials examined: No specimen was found during the surveys. It was recorded from North Bengal by Shaw and Shebbeare (1937).

Distribution: India: Assam, Darjeeling, West Bengal. Nepal and Myanmar.

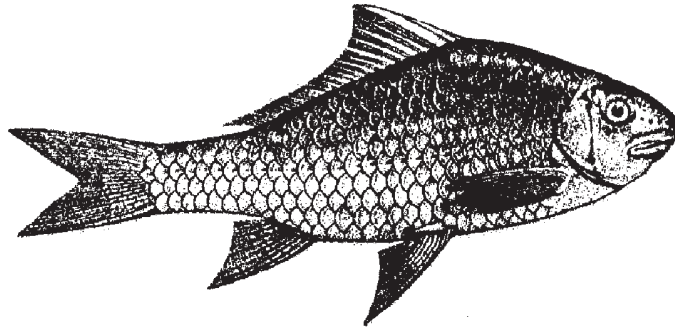
Habitat and Ecology:
Mountain streams and rivers.

Maximum size: 60.0 cm TL.

Endemism: Not endemic.

Conservation Status:
Vulnerable (Lakra et. al, 2010).

Protective measures taken: No measures taken yet.



Recommendations: Habitat alteration is to be prohibited and over-harvesting is to be controlled. Poisoning and explosion in the hill streams are sometimes used for catching hill stream fishes. These methods are very destructive, so these should be monitored and prohibited by law to save fishes and other aquatic animals occurring in hill streams.

12. *Danio dangila* (Hamilton, 1822) (Danio)

1822. *Cyprinus dangila* Hamilton, *Fish Ganges*: 321,309 (Mountain streams Monghyr, Bihar).

1999. *Danio dangila*: Menon, *Rec. zool. Surv. India, Occ. Paper No. 175*: 40-41.

Vernacular names: Neptee.

Materials examined: (i) 3 exs., 35-64 mm SL; Neora River, Lataguri, Jalpaiguri district, North Bengal; R. P. Barman and party; 29.i.2010.

Distribution: India, Bangladesh, Nepal and Myanmar.

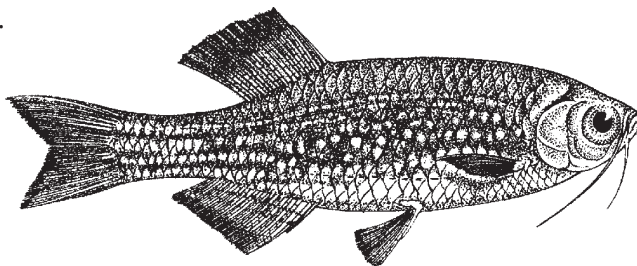
Habitat and Ecology: Hill streams.

Maximum size: 152 mm TL.

Endemism: Not endemic.

Conservation Status: Vulnerable
(Lakra et. al, 2010).

Protective measures taken: No measures taken yet.



Recommendations: Habitat alteration is to be prohibited and over-harvesting is to be controlled. Poisoning and explosion in the hill streams are sometimes used for catching hill

stream fishes. These methods are very destructive, so these should be monitored and prohibited by law to save fishes and other aquatic animals harbouring in hill streams.

13. *Danionella priapus* Britz, 2009

2009. *Danionella priapus* Britz, 2009, (Jorai river, a tributary of the Sankosh at Laskarpara, Bramaputra River drainage, Jalpaiguri District, West Bengal, India).

Vernacular names: Nil.

Materials examined: No specimen examined by me. It has been recorded by Britz (2009) from North Bengal.

Distribution: India: so far known from the type locality, Jorai River, Brahmaputra drainage in India.

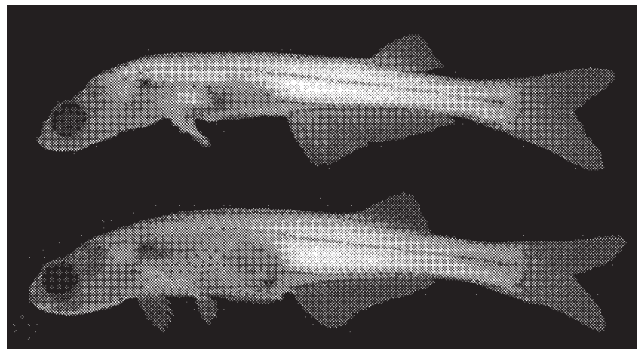
Habitat and Ecology: Hill streams and benthopelagic.

Maximum size: 16 mm SL.

Endemism: Endemic.

Conservation Status: data deficient.

Protective measures taken: No measures taken yet.



Top : Male specimen and Bottom : female specimen

Recommendations: This species is one of the smallest fishes and commercially not important. Habitat alteration is to be prohibited and indiscriminate harvesting is to be controlled. Mesh size of the net is also to be monitored to protect and conserve this fish. Poisoning and explosion in the hill streams are sometimes used for catching hill stream fishes. These methods are very destructive, so these should be monitored and prohibited by law to save fishes and other aquatic animals harbouring in hill streams.

Remarks: *Danionella priapus* is easily distinguished from its congeners by the conically projecting genital papilla and the funnel-shaped pelvic fins of males, and by its 8 pectoral-fin rays, but also by its longer anal fin, which consists of 20–21 rays. The three rows of dorsal-pigment pattern of the body of *D. priapus* are also diagnostic of the species (Britz, 2009).

14. *Garra gotyla gotyla* (Gray, 1832) (Stone sucker)

1832. *Cyprinus gotyla* Gary, *Illus. Indian Zool.* London, **1**, pl.88, fig.3, 3a (Northern India)

1999. *Garra gotyla gotyla*: Menon, *Rec. zool. Surv. India, Occ. Paper No. 175*: 143-144

Vernacular names: Ghor poia.

Materials examined: (i) 1 ex., 72 mm SL; Alipurduar, Jalpaiguri district, North Bengal; R. P. Barman and party; 25.viii.2008. (ii) 1 ex., 120 mm SL; Sankosh River, Kamakhaguri, Alipurduar, Jalpaiguri district, North Bengal; R. P. Barman and party; 27.viii.2008. (iii) 6 exs., 65-85 mm SL; Lataguri fish market, Jalpaiguri district, North Bengal; R.P.Barman & party; 26.i.2010.

Distribution: India: Assam, all along the Himalayas, Chota Nagpur plateau and the Vindhya-Satpura Mountains of the Peninsula. Bangladesh, Pakistan, Nepal and Myanmar.

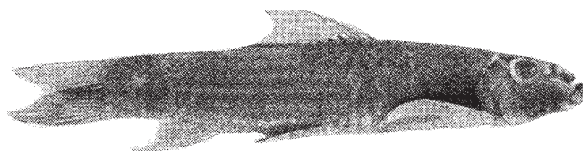
Habitat and Ecology: It occurs in the mountain streams.

Maximum size: 14.5 cm TL

Endemism: Not endemic.

Conservation Status: Vulnerable (Lakra *et. al*, 2010).

Protective measures taken: No measures taken yet.



Recommendations: Habitat alteration is to be prohibited and over-harvesting is to be controlled. Poisoning and explosion in the hill streams are sometimes used for catching hill stream fishes. These methods are very destructive, so these should be monitored and prohibited by law to save fishes and other aquatic animals occurring in mountain streams.

15. *Labeo nandina* (Hamilton, 1822)

1822. *Cyprinus nandina* Hamilton, *Fishes of Ganges*: 300, pl.8, fig.84 River Mahananda).

1999. *Labeo nandina*: Menon, *Rec. zool. Surv. India, Occ. Paper No. 175*: 135

Vernacular names: Nil.

Materials examined: No specimen was observed during the survey. It was recorded from North Bengal by Shaw and Shebbeare (1937).

Distribution: India: West Bengal and Assam. Bangladesh and Myanmar.

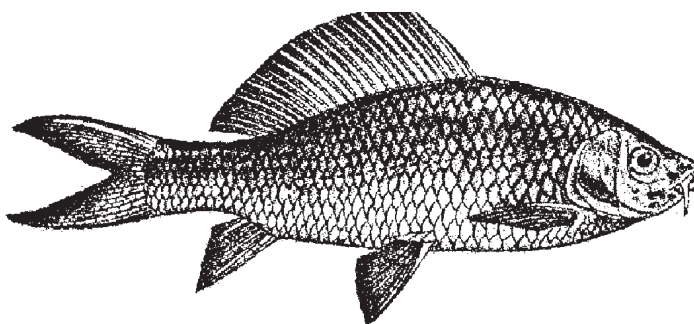
Habitat and Ecology: Large Rivers usually higher reaches.

Maximum size: 26.0 cm TL.

Endemism: Not endemic.

Conservation status: Vulnerable (Lakra *et. al*, 2010).

Protective measures taken: No measures taken yet.



Recommendations: Over-harvesting and habitat alteration is to be controlled to protect this species.

16. ***Labeo pangusia*** (Hamilton, 1822)
(*Pangusia labeo*)

1822. *Cyprinus pangusia* Hamilton, *Fish Ganges*: 285,386 (Kosi river).

2004. *Labeo pangusia*: Menon: *Threatened fishes of India and their conservation*: 111-113.

Vernacular names: Uttā.

Materials examined: (i) 1 ex., 102 mm SL; Tista river, Jalpaiguri, North Bengal; R. P. Barman and party; 30.viii.2008.

Distribution: Indian: All along the Himalayas including Kashmir, Chota Nagpur, Vindhya-Satpura ranges, Deccan and South as far as the Cauvery. Pakistan, Nepal and Bangladesh.

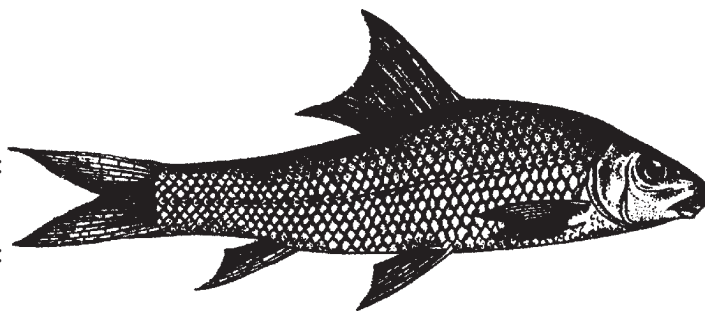
Habitat and Ecology: Mountain streams and rivers in the upper reaches. It is a cultivable species and bottom feeder.

Maximum size: 90 cm TL.

Endemism: Not endemic.

Conservation Status:
Vulnerable (Menon, 2004).

Protective measures taken:
No measures taken yet.



Recommendations: Indiscriminate killing by damming the streams and use of explosives in the mountainous may be prohibited. Some of the deep water bodies in the course of rivers at the base of the Himalayas where this species rests may be declared as sanctuaries.

17. ***Neolissocheilus hexagonolepis*** (McClelland, 1839)
(Copper mahaseer)

1839. *Barbus hexagonolepis* McClelland, *Asiat. Res.*, **19**: 270,271,336, pl.41, fig.3 (Upper Assam)

2004. *Neolissocheilus hexagonolepis*: Menon, *Threatened fishes of India and their conservation*: 24-26

Vernacular names: Bhorkolo, Buluk.

Materials examined: (i) 1 ex., 130 mm SL; Torsa River, Cooch Behar, North Bengal; R. P. Barman and party; 28.viii.2008. (ii) 1 ex., 120 mm SL; Ralli River, Kalimpong, North Bengal; R. P. Barman and party; 03.ix.2008.

Distribution: India; Eastern Himalayas, Assam. Bangladesh and Burma.

Habitat and Biology: Fast flowing rivers and streams with rocky beds. This species breeds

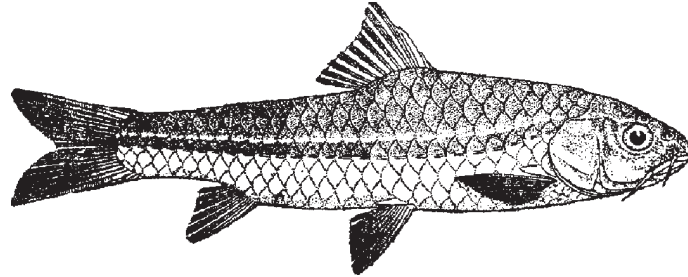
from April to October with a peak in August to September. It feeds weeds, grasses and submerged vegetation in river.

Maximum size: 60.0 cm TL.

Endemism: Not endemic.

Conservation Status:
Endangered (Menon, 2004).

Protective measures taken:
No measures taken yet.



Recommendations: Dams and weirs at higher reaches of the Brahmaputra River have affected the spawning run of this species. So, construction of dams and weirs are to be monitored very carefully. A stretch of the Brahmaputra River may be declared as the Fish sanctuary to protect this species.

18. *Oreichthys crenuchoides* Schafer, 2009

2009. *Oreichthys crenuchoides* Schafer, *Ichthyol. Explor. Freshwaters* **20**(3):201-211 (River Jorai in West Bengal, India.)

Vernacular names: Nil.

Materials examined: No specimen examined by me. It was recorded from North Bengal by Schafer (2009).

Distribution: India: River Jorai in West Bengal a tributary of the River Brahmaputra near the border with Assam.

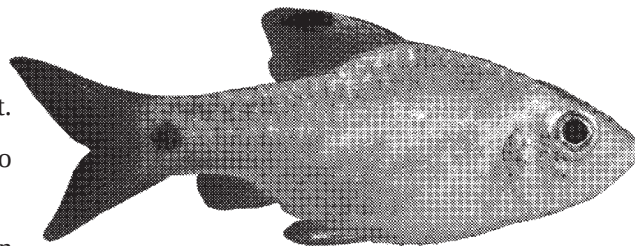
Habitat and Ecology: Slow flowing river with a muddy substrate, contained quite clear water and was flowing slowly through 'open land', and this would seem typical since congeners also display a preference for slow-moving habitat (Schafer,2009).

Maximum size: 45 mm SL.

Endemism: Endemic.

Conservation status: data deficient.

Protective measures taken: No measures taken yet.



Recommendations: While collection of live fishes for the ornamental fish trade may present a potential threat to the population, its effects are presently unknown because no information on the population and its trends for this species is known, as is the intensity of harvest for the trade.

Remarks: *Oreochthys crenuchoides* is distinguished from congeners by the absence of a spot or blotch on the anal fin, $7\frac{1}{2}$ scales between the pelvic-fin origin and dorsal midline, a blunt snout, a large, black blotch at the base of the caudal fin, 11–13 rows of pores on the cheek, enlarged dorsal fin in males and pharyngeal teeth in three rows (1-1-4) (Schafer, 2009).

19. ***Poropuntius clavatus*** (McClelland, 1845)

(Stedman barb)

1845. *Barbus clavatus* McClelland, *Calcutta J. nat. Hist.*, **280**, pl.21 (Sikkim Mountain on the northern frontier of Bengal).

2004. *Poropuntius clavatus*: Menon, *Threatened fishes of India and their conservation*: 81-83.

Vernacular names: Nil.

Materials examined: No specimen was found during the surveys. It was recorded from North Bengal by Shaw and Shebbeare (1937).

Distribution: India, Nepal and Bangladesh.

Habitat and Ecology: Streams and rivers at foothills.

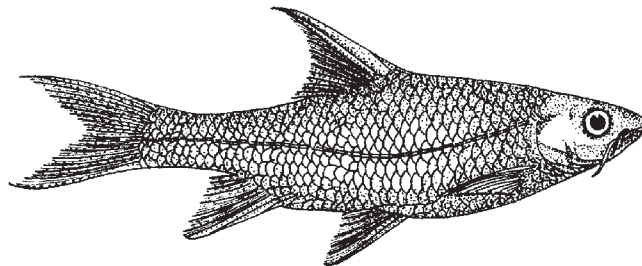
Maximum size: 24 cm TL.

Endemism: Not endemic.

Conservation Status: Vulnerable (Molur & Walker, 1998).

Protective measures taken: No measures taken yet.

Recommendations: Habitat loss and degradation of this species are to be controlled to protect and preserve this species. Pollution of the water bodies where this is available is to be monitored and controlled to save and preserve this species.



20. ***Systomus sarana*** (Hamilton, 1822)

(Olive barb)

1822. *Cyprinus sarana* Hamilton, *Fishes of Ganges*: 307, 388 (Gangetic river system Bengal).

2012. *Systomus sarana* : Pethiagoda, *Ichthyol. Explor. Freshwat.*, **23** (1): 77.

Vernacular names: Swarna puti.

Materials examined: (i) 2 ex., 70-79 mm SL; Kaljani River, Salsabari, Alipurduar, Jalpaiguri district, North Bengal; R. P. Barman and party; 26.viii.2008.(ii) 2 ex., 80-83 mm SL; Alipurduar, Jalpaiguri district, North Bengal; R. P. Barman and party; 25.viii.2008.(iii) 1 ex., 86 mm SL, Tista River, Siliguri, North Bengal; R. P. Barman and party; 02.ix.2008.

Distribution: India, Pakistan, Bangladesh, Nepal, Myanmar, Thailand and China.

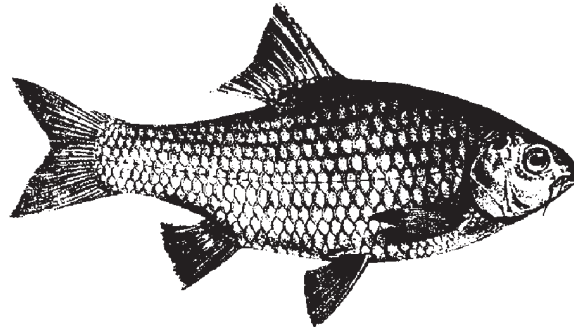
Habitat and Ecology: Streams, Rivers, Reservoirs and Tanks.

Maximum size: 31 cm TL.

Endemism: Not endemic.

Conservation status: Vulnerable (Lakra et. al.2010).

Protective measures taken: No measures taken yet.



Recommendations: Habitat alteration and over-harvesting of this species are to be monitored. A suitable site of the water bodies of its occurrence may be selected for setting up a fish sanctuary for this species.

21. *Raiamas bola* (Hamilton, 1822)
(Indian trout, Trout barb)

1822. *Cyprinus bola* Hamilton-Buchanan, *Fishes of Ganges*: 274, 385 (Brahmaputra River).

2004. *Raiamas bola*: Menon, *Threatened fishes of India and their conservation*: 15-17.

Vernacular names: Bola.

Materials examined: (i) 1 ex., 110 mm SL; Torsa River, Cooch Behar, North Bengal; R. P. Barman and party; 28.viii.2008.(ii) 1 ex., 130 mm SL; Tista River, Jalpaiguri, North Bengal; R. P. Barman and party; 31.viii.2008.

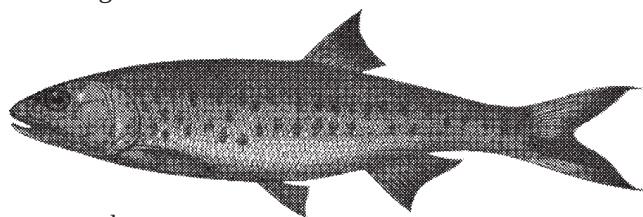
Distribution: India: Freshwaters along the base of the Himalayas, Bihar and Uttar Pradesh. Nepal.

Habitat and Biology: This species occurs in Rivers and Mountain streams and breeds during early monsoon after attaining three years of age.

Maximum size: 30.0 cm TL.

Endemism: Not endemic.

Conservation status: Endangered (Menon, 2004).



Protective measures taken: No measures taken yet.

Recommendations: Overexploitation of this species should be controlled. A fish sanctuary should be set up in the Nepal Terai for protection of this species. Poisoning and explosion in the mountain streams are sometimes used for catching mountain stream fishes. These methods are very destructive, so these should be monitored and prohibited by law to save fishes and other aquatic animals occurring in mountain streams.

22. *Schizothorax richardsonii* (Gray, 1832)
(Snow trout)

1832. *Cyprinus richardsoni* Gary, *Illus. Indian Zool.*, **1**, pl. 94, fig. 2 (India)

1991. *Schizothorax richardsoni*: Talwar and Jhingran, *Inland Fishes of India and adjacent countries*, **1**: 411.

Vernacular names: Nak-katwa asala.

Materials examined: (i) 3 ex., 84-98 mm SL; Sankosh River, Kamakhaguri, Alipurduar, Jalpaiguri district, North Bengal; R. P. Barman and party; 27.viii.2008.(ii) 1 ex., 75 mm SL; Kalimpong, Darjeeling district, North Bengal; R. P. Barman and party; 03.ix.2008.

Distribution: India: All along the Himalayas from Jumma and Kashmir to Assam through Sikkim. Bhutan, Nepal, Pakistan and Afganistan.

Habitat and Ecology: Mountain streams and rivers.

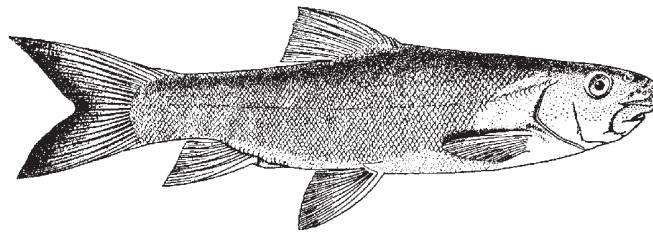
Maximum size: 60.0 TL.

Endemism: Not endemic.

Conservation status: Vulnerable (Lakra *et. al*, 2010).

Protective measures taken: No measures taken yet.

Recommendations: Habitat alteration and overexploitation of this species are to be prohibited. A suitable site may be selected along its occurrence for setting a fish sanctuary for this species for its protection.



23. *Tor putitora* (Hamilton, 1822)
(Mahaseer, Golden mahaseer)

1822. *Cyprinus putitora* Hamilton, *Fishes of Ganges*: 303, 388 (Eastern parts of Bengal).

2004. *Tor putitora*: Menon, *Threatened fishes of India and their conservation*: 36-38.

Vernacular names: Mahasol.

Materials examined: (i) 1 ex., 130 mm SL; Sankosh River, Kamakhaguri, Alipurduar, Jalpaiguri district, North Bengal; R. P. Barman and party; 27.viii.2008.

Distribution: India: Freshwaters all along the base of the Himalayas including Kashmir. Pakistan and Bangladesh.

Habitat and Biology: Rapid streams with rocky beds .This species breeds during July to August. It feeds on green algae, insect larvae and aquatic vegetations.

Maximum size: 2.7 m. TL.

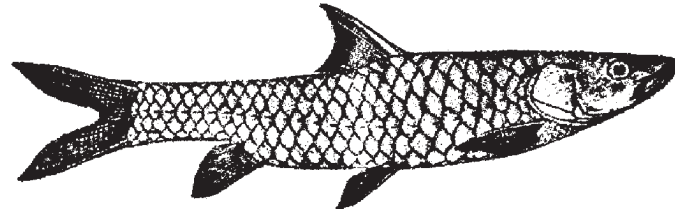
Protective measures taken: Some tanks and water bodies near temples in Haridwar and Raniketh serve as sanctuaries.

Endemism: Not endemic.

Conservation status:
Endangered (Lakra *et. al*, 2010).

Recommendations: Fish sanctuaries may be declared where this species exists.

Remarks: Although it is known to grow to 2.7 m but maximum size recorded by Hora is 60 cm. At present specimens more than 30 cm and 5 kg are rare (Menon2004).



24. ***Tor tor*** (Hamilton, 1822)
Mahaseer)

1822. *Cyprinus tor* Hamilton, *Fishes of Ganges*: 305, 388 (Mahananda River).

2004. *Tor tor*: Menon, *Threatened fishes of India and their conservation*: 38-41.

Vernacular names: Tor.

Materials examined: (i) 1 ex., 122 mm SL; Sankosh River, Kamakhaguri, Alipurduar, Jalpaiguri district, North Bengal; R. P. Barman and party; 27.viii.2008.

Distribution: India: Freshwaters all along the base of the eastern and central Himalayas up to Jamuna river systems. Assam, Mahanadi in Orissa and Vindhya and Satpura ranges of Madhya Pradesh. Bangladesh and Myanmar.

Habitat and Biology: Rapid streams with rocky beds. The biology of this species appears to be same as *Tor putitora* which breeds during July to August. It feeds on insect larvae and aquatic vegetations.

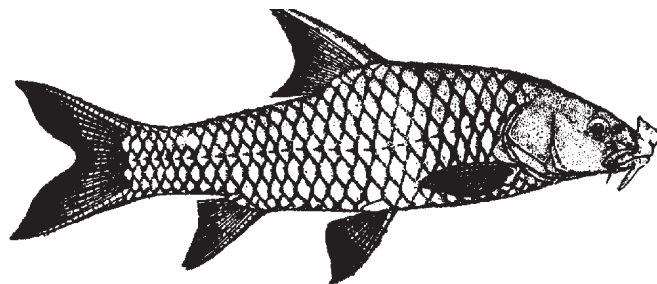
Maximum size: 1.7m.TL and weight up to a quintal.

Endemism: Not endemic.

Conservation status:
Endangered (Lakra *et. al*, 2010).

Protective measures taken:
Some water bodies in the temple regions serve as sanctuaries.

Recommendations: Streams and rivers where this species occurs may be considered for declaring fish sanctuaries.



Family 5: BALITORIDAE (River loaches)

25. *Aborichthys elongatus* (Hora, 1921)

1921. *Aborichthys elongatus* Hora, *Rec. Indian Mus.*, **22**: 735 (Reang River, base of Darjeeling Himalayas).

1991. *Aborichthys elongatus*: Talwar and Jhingran, *Inland Fishes of India and adjacent countries*, **1**: 457.

Vernacular names: Nil.

Materials examined: (i) 1 ex., 48 mm SL; Korola River, Jalpaiguri, North Bengal; R. P. Barman and party; 28.viii.2008.

Distribution: India: North Bengal (West Bengal).

Habitat and Ecology: Streams with pebbly bed.

Maximum size: 5.4 cm SL.

Endemism: Endemic.

Conservation status: Endangered (Molur & Walker, 1998).

Protective measures taken: No measures taken yet.

Recommendations: Streams and water bodies where this species occurs may be considered for establishment of the fish sanctuaries. Fish habitat restoration enhancement work should be prompted.



26. *Schistura devdevi* (Hora, 1935)

1935. *Nemachilus devdevi* Hora, *Rec. Indian Mus.*, **37**: 54, pl.3, fig.5 & 6 (Eastern Himalayas: small streams below Darjeeling and Sikkim).

1999. *Schistura devdevi*: Jayaram, *Handbk. Freshwater fishes of Indian region*: 181.

Vernacular names: Nil.

Materials examined: (i) 2 ex., 52-67 mm SL; Rajabhatkhawa, Alippurduar, Jalpaiguri, North Bengal; R. P. Barman and party; 23.i.2010.

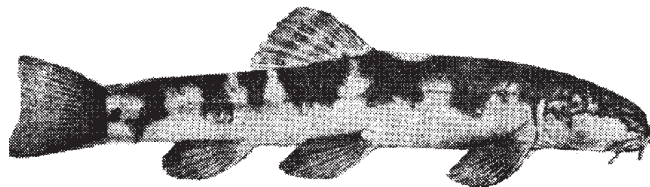
Distribution: India: Eastern Himalayas.

Habitat and Ecology: Clear, swift streams with pebbly bottom.

Maximum size: 4.0 cm SL.

Endemism: Not endemic.

Conservation status: Endangered (Molur & Walker, 1998).



Protective measures taken: No measures taken yet.

Recommendations: Streams and water bodies where this species occurs may be considered for establishment of the fish sanctuaries. Fish habitat restoration enhancement work should be prompted.

27. *Schistura multifasciatus* Day, 1878

1878. *Nemachilus multofaciatus* Day (in part), *Fish India*: 617, pl.153, fig.7 (Darjeeling and Assam).

1995. *Schistura multifasciatus*: Banarescu and Nalabant, *Trav. Mus. Hist. Nat. "Grigore Antipa"*, **35**: 440.

Vernacular names: Nil.

Materials examined: (i) 2 ex., 50-55 mm SL; Tista river, Jalpaiguri, North Bengal; R. P. Barman and party; 30.viii.2008.

Distribution: India: easter Himalayas: from Tista through the base of Nepal Himalayas as far as the Ghaghra and Kali drainage.

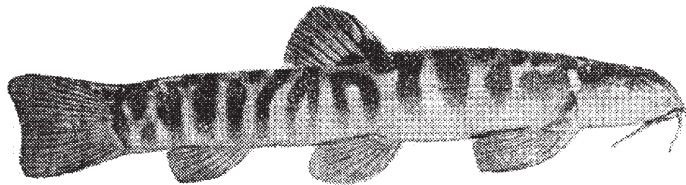
Habitat and Ecology: Rapid streams and rivers with gravelly bottom.

Maximum size: 9.5 cm SL.

Endemism: Not endemic.

Conservation status: Vulnerable(Lakra et. al, 2010).

Protective measures taken: No measures taken yet.



Recommendations: Streams and water bodies where this species occurs may be considered for establishment of the fish sanctuaries. Fish habitat restoration enhancement work should be prompted.

Family 6: COBITIDAE (Loaches)

28. *Botia almorae* Gray, 1831

(Almorah loach)

1831. *Botia almorae* Gary, *Zool. Misc.*, **8** (Almora).

1999. *Botia almorae*: Menon, *Rec. zool. Surv. India, Occ. Paper No. 175*: 155-156.

Vernacular names: Nil.

Materials examined: (i) 3 ex., 58-65 mm SL; Tista river, Jalpaiguri, North Bengal; R. P. Barman and party; 30.viii.2008.

Distribution: India: Easter Himalayas: Teesta at Darjeeling through Nepal to as far as Jumuna at Delhi, Rajasthan: Chambal drainage., Uttar Pradesh: Sone drainage.

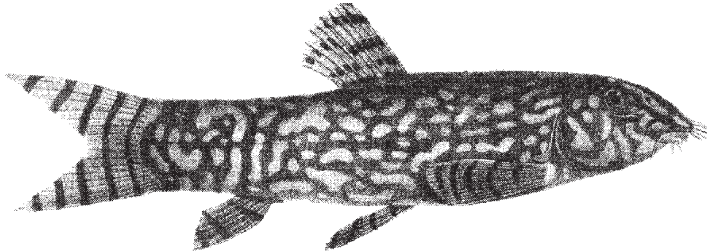
Habitat and Ecology: Clear Mountain streams.

Maximum size: 14.8 cm SL.

Endemism: Not endemic.

Conservation status: Vulnerable (Menon, 1991).

Protective measures taken: No measures taken yet.



Recommendations: Streams and water bodies where this species occurs may be considered for establishment of the fish sanctuaries. Fish habitat restoration enhancement work should be prompted.

29. *Botia dario* (Hamilton, 1822) (Loach)

1822. *Cobitis dario* Hamilton, *Fishes of Ganges*: 354, 394, pl.29, fig.95 (Rivers of Bengal).

1999. *Botia dario*: Menon, *Rec. zool. Surv. India, Occ. Paper No. 175*: 157-158.

Vernacular names: Ranimach

Materials examined: (i) 3 ex., 95-127 mm SL; Sankosh River, Kmakhaguri, Alippurduar., Jalpaiguri district, North Bengal; R. P. Barman and party; 27.viii.2008. (ii) 1 ex., 78 mm SL; Tista River, Jalpaiguri, North Bengal; R. P. Barman and party; 31.viii.2008. (iii) 1 ex., 97 mm SL; Darjeeling, North Bengal; R. P. Barman and party; 06.ix.2008.

Distribution: India: Assam, Bihar, Tripura, West Bengal, Meghalaya, Uttar Pradesh, Punjab. Bangladesh.

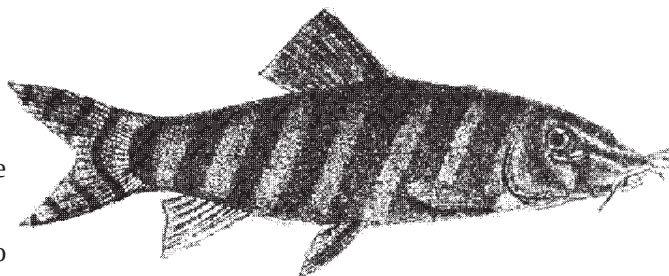
Habitat and Ecology: Clear Mountain streams.

Maximum size: 11 cm SL.

Endemism: Not endemic.

Conservation status: Vulnerable (Lakra et. al, 2010).

Protective measures taken: No measures taken yet.



Recommendations: Streams and water bodies where this species occurs may be considered for establishment of the fish sanctuaries. Fish habitat restoration enhancement work should be prompted.

30. *Pangio apoda* Britz & MacLaine, 2007

2007. *Pangio apoda* Britz & MacLaine, *Ichthyol. Explor. Freshwat.* **18**(1):17-30. (Tista drainage in North Bengal, India).

Vernacular name: Nil.

Materials examined: No specimen examined. This species has been recorded by (Britz & MacLaine, 2007).

Distribution: India: so far known from Tista drainage, North Bengal only.

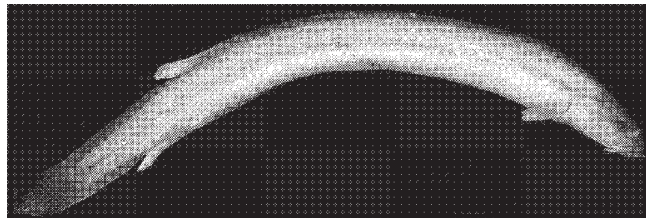
Habitat and Ecology: This is a hill stream loach. This species is a bottom dweller. This species is only known from Tista River, Brahmaputra drainage, West Bengal, India.

Maximum size: 3.8 cm SL.

Endemism: Endemic.

Conservation status: Data deficient.

Protective measures taken: No measures taken yet.



Recommendations: Habitat alteration is to be prohibited and over-harvesting is to be controlled. Poisoning and explosion in the hill streams are sometimes used for catching hill stream fishes. These methods are very destructive, so these should be monitored and prohibited by law to save fishes and other aquatic animals harbouring in hill streams.

Remarks: *P. apoda* is distinguished from all other *Pangia* except *P. fusca* and *P. pulla* by the absence of pelvic girdle and pelvic fins. This species differs from *P. fusca* by less number of abdominal vertebrae (38-39 vs 41-44), a further anteriorly placed dorsal fin, predorsal length 69-73.3 vs 74.8 to 78.7% of standard length and absence of nasal barbel vs present. This species also differs from *P. pulla* by the plain brown colour pattern vs blackish brown colour pattern with 20 to 25 vertical bars and fewer vertebrae (38-39+12-14=51-53 vs 46-48+15-16=61-62) (Britz and MacLaine, 2007).

31. *Pangio pangia* (Hamilton, 1822)

1822. *Cobitis pangia* Hamilton, *Fishes of Ganges*: 355, 394 (North-Eastern parts of Bengal).

1999. *Pangio pangia*: Menon, *Rec. zool. Surv. India, Occ. Paper No.* **175**: 166.

Vernacular names: Pangya.

Materials examined: No specimen was found during the surveys. It was recorded from North Bengal by Shaw and Shebbeare (1937).

Distribution India: North-eastern Bengal, Assam and Manipur. Bangladesh and Myanmar.

Habitat and Ecology: Shallow slow moving rivers with sandy bottom.

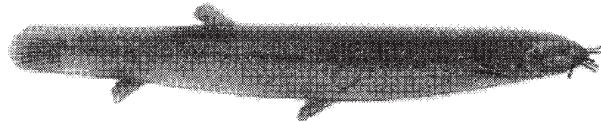
Maximum size: 59 mm SL.

Endemism: Not endemic.

Conservation status: Vulnerable
(Lakra et. al, 2010).

Protective measures taken: No
measures taken yet.

Recommendations: Streams and water bodies where this species occurs may be considered for establishment of the fish sanctuaries. Fish habitat restoration enhancement work should be prompted.



Order VI: Siluriformes (Catfishes)

Family 7: BAGRIDAE (Bagrid catfishes)

32. **Batasio fasciolatus** Ng, 2006.

1941. *Batasio tengana* (non Hamilton) Hoa & Law: 36, pl.2, figs. 1-3 (in part), Jayaram, 1977:17

2006. *Batasio fasciolatus* Ng, *J. Fish Biology*, **68** (Supplement A):107-110 (Tista River, North Bengal).

Vernacular name: Nil.

Materials examined: No specimen examined. This species recorded from North Bengal by Ng (2006).

Distribution: India: Tista River drainage, a tributary of the Brahmaputra, North Bengal.

Habitat and Ecology: River

Maximum size: 67 mm SL.

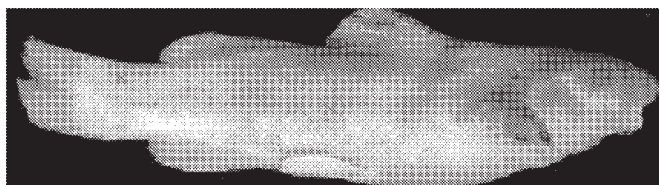
Endemism: Endemic.

Conservation status: Data
deficient.

Protective measures taken:
No measures taken yet.

Recommendations: Habitat alteration is to be prohibited and over-harvesting is to be controlled. Poisoning and explosion in the hill streams are sometimes used for catching hill stream fishes. These methods are very destructive, so these should be monitored and prohibited by law to save fishes and other aquatic animals harbouring in hill streams.

Remarks: *Batasio fasciolatus* were previously identified as *B. tengana*, but can be further



distinguished from it in having a longer adipose-fin base (24.5–25.3 v. 14.5–17.5% of standard length), deeper caudal peduncle (10.1–11.8 vs. 6.7–8.2% in standard length) and smaller eye (16.5–18.8 vs. 21.9–32.1 % of head length). The only other species of *Batasio* with at least one vertical bar on the body found in the Brahmaputra River drainage is *B. merianiensis*, but *B. fasciolatus* differs from it in having smaller pectoral spine (12.7–14.3 vs. 16.3% of head length) and eye (16.5–18.8 vs. 25.9% of head length).

33. *Sperata aor* (Hamilton, 1822)
(Long whiskered catfish)

1822. *Pimelodus aor* Hamilton, *Fishes of Ganges*: 205, 379, pl.20, fig.68 (Rivers of Bengal and upper parts of Gangetic estuaries).

2006. *Sperata aor*: Jayaram, *Catfishes of India*: 27.

Vernacular names: Arr.

Materials examined: (i) 1 ex., 305 mm SL; Tista river, Jalpaiguri, North Bengal; R. P. Barman and party; 29.viii.2008.

Distribution: India: Ganga, Yamuna, Brahmaputra, Krishna, Cauvery, Mahanadi, Tapi and Narmada River systems. Pakistan: Indus River systems. Bangladesh, Pakistan, Nepal and Myanmar.

Habitat and Ecology: Large Rivers, Lakes and reservoirs.

Maximum size: 1.8 m
TL.

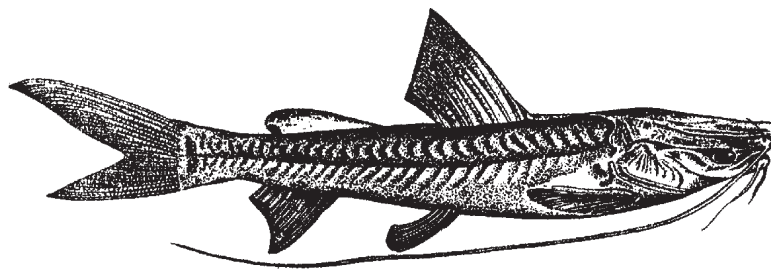
Endemism: Not
endemic.

*Conservation
Status*: Vulnerable
(Lakra *et. al*, 2010).

*Protective measures
taken*: No measures
taken yet.

Recommendations: Over-harvesting and habitat alteration of this species are to be prohibited. A suitable site in the water bodies of its occurrence may be selected along its occurrence for setting up of fish sanctuary.

Remarks: This is the only species under the genus known from fossil records (Jayaram, 2006).



Family 8: SILURIDAE (Sheat fishes)

34. ***Ompok pabda*** (Hamilton, 1822)
(Butter catfish)

1822. *Silurus pabda* Hamilton, *Fishes of Ganges*: 150, 374, pl. 25, fig.47 (Bengal).

2006. *Ompok pabda*: Jayaram, *Catfishes of India*: 108-109.

Vernacular names: Pabda.

Materials examined: (i) 2 exs., 77-90 mm SL; Rajabkathawa, Alipurduar, Jalpaiguri district, North Bengal; R. P. Barman and party; 23.i.2010.

Distribution: India: Throughout northern India. Pakistan, Bangladesh and Myanmar.

Habitat and ecology: It occurs in clear as well as muddy rivers, streams, ponds and Lakes.

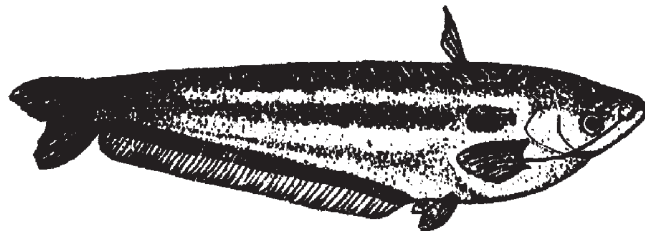
Maximum size: 17.0 cm TL.

Endemism: Not endemic.

Conservation status: Vulnerable
(Lakra *et. al*, 2010).

Protective measures taken: No measures taken yet.

Recommendations: Pollution of the water bodies where this species normally occurs should be monitored and habitat alteration of this species should be prohibited as far as possible. Over fishing are also to be checked.



35. ***Ompok pabo*** (Hamilton, 1822)
(Butter catfish)

1822. *Silurus pabo* Hamilton, *Fishes of Ganges*: 153, pl. 17, fig.48 (Brahmaputra River, Assam).

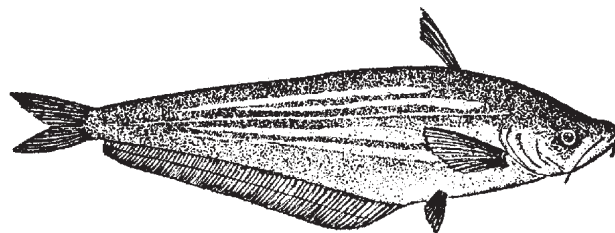
2006. *Ompok pabda*: Jayaram, *Catfishes of India*: 109-110.

Vernacular names: Pabda.

Materials examined: (i) 2 ex., 77-90 mm SL; Rajabkathawa, Alipurduar, Jalpaiguri district, North Bengal; R. P. Barman and party; 23.i.2010.

Distribution: India: North Bengal, Assam. Brahmaputra, Ganga, Jamuna river systems. Bangladesh and Myanmar.

Habitat and Ecology: Rivers, ponds and lakes.



Maximum size: 17.0 cm TL.

Endemism: Not endemic.

Conservation status: Endangered (Lakra *et. al*, 2010).

Protective measures taken: No measures taken yet.

Recommendations: Pollution of the water bodies where this species normally occurs should be monitored and habitat alteration of this species should be prohibited as far as possible. Over fishing of this species is also to be monitored.

Family 9: SCHILBEIDAE (Schilbid catfishes)

36. ***Clupisoma garua*** (Hamilton, 1822)
(Garua Bachcha)

1822. *Silurus garua* Hamilton, *Fishes of Ganges*: 156, 375, pl.21, fig.50 (Rivers of the Gangetic Provinces).

2006. *Clupisoma garua*: Jayaram, *Catfishes of India*: 125-126.

Vernacular names: Gaura.

Materials examined: (i) 1ex., 116 mm SL; Torsa River, Cooch Behar, North Bengal; R. P. Barman and party; 28.viii.2008. (ii) 2 ex., 96-110 mm SL; Rajabkatkhawa, Alipurduar, Jalpaiguri district, North Bengal; R. P. Barman and party; 23.i.2010.

Distribution: India, Nepal, Pakistan and Bangladesh.

Habitat and Ecology: Large freshwater and tidal rivers.

Maximum size: 85 cm TL.

Endemism: Not endemic.

Conservation status:
Vulnerable (Molur & Walker, 1998).

Protective measures taken:
No measures taken yet.

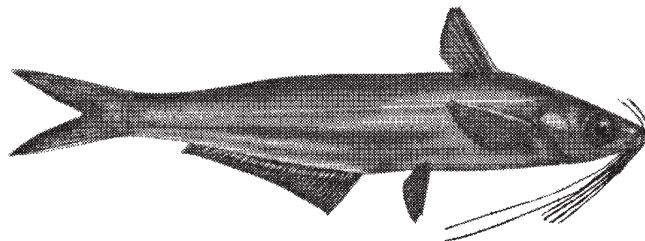
Recommendations: Pollution of the water bodies where this species normally occurs should be monitored and habitat alteration of this species should be prohibited as far as possible. Over fishing of this species is also to be monitored.

37. ***Eutropiichthys vacha*** (Hamilton, 1822)
(Vacha)

1822. *Pimelodus vacha* Hamilton, *Fishes of Ganges*: 196, 378, pl.19, fig.64 (Rivers of Gangetic Province).

2006. *Eutropiichthys vacha*: Jayaram, *Catfishes of India*: 137-138.

Vernacular names: Bacha.



Materials examined: (i) 2 exs., 180-210 mm SL; Tista river, Jalpaiguri, North Bengal; R. P. Barman and party; 29.viii.2008.

Distribution: India: Northern and north-Eastern parts up to Orissa. Pakistan, Bangladesh, Nepal, Myanmar and Thailand.

Habitat and Ecology: Rivers and estuaries.

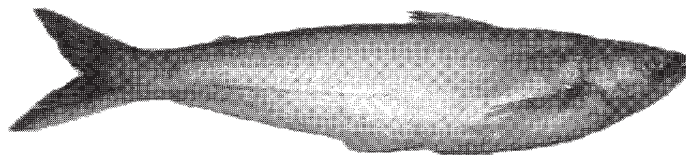
Maximum size: 30.00 cm TL.

Endemism: Not endemic.

Conservation status:
Vulnerable (Lakra *et. al*, 2010).

Protective measures taken:
No measures taken yet.

Recommendations: Pollution of the water bodies where this species normally occurs should be monitored and habitat alteration of this species should be prohibited as far as possible. Over fishing of this species is also to be monitored.



38. *Silonia silondia* (Hamilton, 1822)

1822. *Pimelodus silondia* Hamilton, *Fishes of Ganges*: 160, 375, pl. 7, fig.50 (Gangetic provinces).

2006. *Silonia silondia*: Jayaram, *Catfishes of India*: 140-141.

Vernacular names: Silolong, Silon.

Materials examined: (i) 2 ex., 77-90 mm SL; Rajabkathawa, Alipurduar, Jalpaiguri district, North Bengal; R. P. Barman and party; 23.i.2010.

Distribution: India: Northern India. Pakistan, Nepal and Bangladesh.

Habitat and Ecology: Large Rivers and estuaries.

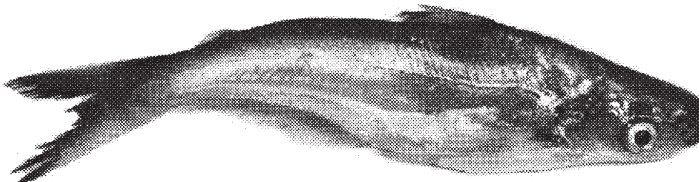
Maximum size: 17.0 cm TL.

Endemism: Not endemic.

Conservation status:
Vulnerable(Lakra *et. al*, 2010).

Protective measures taken:
No measures taken yet.

Recommendations: Pollution of the water bodies where this species normally occurs should be monitored and habitat alteration of this species should be prohibited as far as possible. Over fishing of this species is also to be monitored.



Family 10: PANGASIIDAE (Shark catfish)

39. ***Pangasius pangasius*** (Hamilton, 1822)
(Pangash)

1822. *Pimelodus pangasius* Hamilton, *Fishes of Ganges*: 163, 376, pl.33, fig.52 (Estuaries of Bengal).

2004. *Pangasius pangasius*: Menon, *Threatened fishes of India and their conservation*: 128-130.

Vernacular names: Pangash.

Materials examined: (i) 2 ex., 215-255 mm SL; Torsa river, Cooch Behar, North Bengal; R. P. Barman and party; 28.viii.2008.

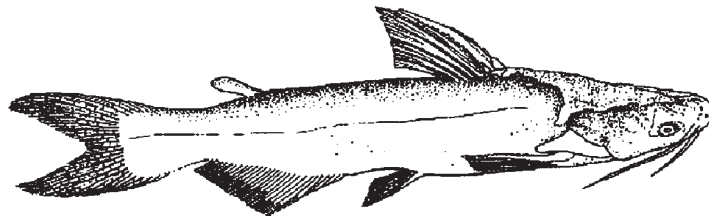
Distribution: India, Pakistan, Bangladesh, Myanmar, Thailand, Malaya, Vietnam and Indonesia.

Habitat and Biology: Rivers and estuaries. It feeds on foul and decaying animals and vegetable matter. It breeds during rainy season in the estuaries.

Maximum size: 1.5 m TL.

Endemism: Not endemic.

Conservation status: Vulnerable (Lakra *et. al*, 2010).



Protective measures taken: No measures taken yet.

Recommendations: Indiscriminate harvesting and over exploitation of this species where it occurs particularly in Godavari and Krishna river systems should be prohibited.

Remark: This species was previously considered as vulnerable species. But the present study indicates that this species is almost not observed in any markets of West Bengal as well as throughout the country.

Family 11: AMBLYCIPITIDAE

40. ***Amblyceps cerinum*** Ng & Wright, 2010

2010. *Amblyceps cerinum* Ng & Wright, *Zootaxa* **2672**: 50-60 (Raidak I River at Shipra, near Buxa Tiger Reserve approx 8 km towards Barobisha on Siliguro-Guwahati Road, North Bengal)

Vernacular name: Nil.

Materials examined: No specimen examined. This species was recorded from North Bengal by the author.

Distribution: India: North Bengal: Brahmaputra River drainage.

Habitat and ecology: Swift flowing stream with a substrate of cobble and sand. This species

is generally found under cobble.

Maximum size: 97.3 mm SL.

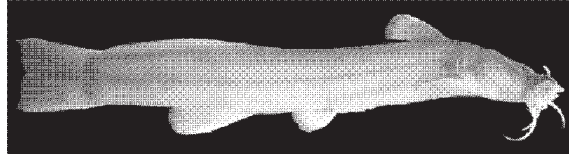
Endemism: Endemic.

Conservation status: Data deficient.

Protective measures taken: No measures taken yet.

Recommendations: Habitat loss and degradation is to be controlled. Poisoning and explosion in the hill streams are sometimes used for catching hill stream fishes. These methods are very destructive, so these should be monitored and prohibited by law to save fishes as well as other aquatic animals harbouring in hill streams.

Remarks: *Amblyceps cerinum* can be distinguished from congeners in having a combination of upper jaw longer than lower, incomplete lateral line terminating beneath posterior insertion of dorsal fin, length of adipose-fin base 32.4–38.3% of standard length, caudal peduncle length 21.9–24.5% of standard length, caudal peduncle depth 9.2–11.2% of standard length, 41–44 post-Weberian vertebrae, posterior end of adipose fin separated from dorsal procurrent caudal-fin rays by distinct notch and truncate caudal fin (Ng & Wright, 2010).



41. *Amblyceps mangois* (Hamilton, 1822) (Indian torrent cat fish)

1822. *Pimelodus mangois* Hamilton, *Fishes of Ganges*: 199, 379 (Northern Bihar).

2004. *Amblyceps mangois*: Menon, *Threatened fishes of India and their conservation*: 128-130.

Vernacular name: Nil.

Materials examined: (i) 8 ex., 33-44 mm SL; Neora river, Jalpaiguri, North Bengal; R. P. Barman and party; 28.i.2010.

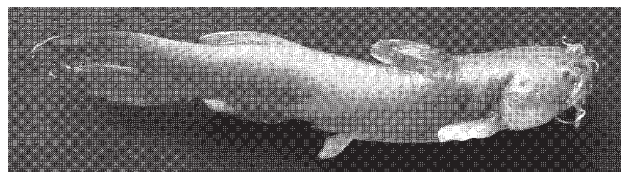
Distribution: India: All along the base of the Himalayas from Kangra to Assam and south wards up to Krishna River systems. Pakistan, Bangladesh, Northern Myanmar and Thailand.

Habitat and Ecology: River bed with sand and pebbles.

Maximum size: 12.7 cm TL.

Endemism: Not endemic.

Conservation status: Endangered (Lakra *et. al*, 2010).



Protective measures taken: No measures taken yet.

Recommendations: Habitat alteration of this species should be prohibited as far as possible.

Poisoning and explosion in the river beds and hill streams are sometimes used for catching fishes. Pollution of river bed is also another threat to this species. So, it should be monitored and controlled to save and preserve this species.

Family 12: SISORIDAE (Sucker catfishes)

42. ***Bagarius bagarius*** (Hamilton, 1822)
(Dwarf Goonch/Bagarius)

1822. *Pimelodus bagarius* Hamilton, *Fish. Ganges*: 186, 378, pl.7, fig.62 (the Ganges and its tributaries).

2004. *Bagarius bagarius*: Menon, *Threatened fishes of India and their conservation*: 132-134.

Vernacular names: Baghmach.

Materials examined: (i) 2 ex.; 235-250 mm SL; Kalimpong, North Bengal; R. P. Barman and party; 05.viii.2008.

Distribution: India, Pakistan, Bangladesh, Nepal, Myanmar, Thailand, Malaya, Vietnam, East Indies and Tonkin.

Habitat and Ecology: Rivers, generally of rapids and rocky pools joining into lower reaches and estuaries. Piscivorous, feed mostly on small fishes.

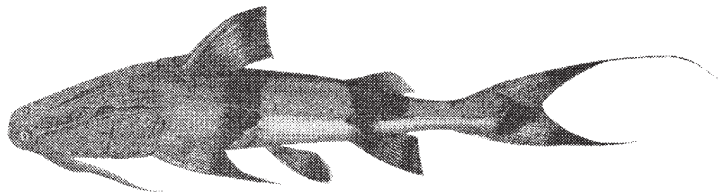
Maximum size: 2 m TL.

Endemism: Not endemic.

Conservation status:
Vulnerable (Menon, 2004).

Protective measures taken:
No measures taken yet.

Recommendations: Indiscriminate harvesting and over exploitation where this species normally found particularly in the Godavari and Krishna river systems should be prohibited, Habitat degradation and loss also should be monitored and controlled to save and preserve this species.



43. ***Glyptothorax cavia*** (Hamilton, 1822)

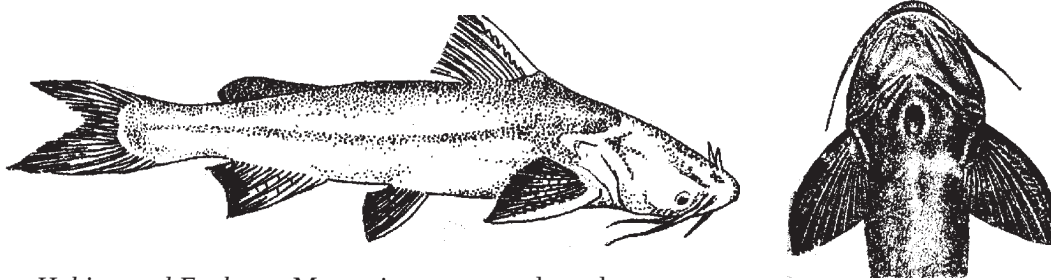
1822. *Pimelodus cavia* Hamilton, *Fish Ganges*: 188, 378, pl.7, fig. 62 (Northern Rivers of Bengal).

2006. *Glyptothorax cavia*: Jayaram, *Catfishes of India*: 217-218.

Vernacular name: Nil.

Materials examined: (i) 2 ex., 57-63 mm SL; Alipurduar, Jalpaiguri, North Bengal; R. P. Barman and party; 25.viii.2008. (ii) 1 ex., 130 mm SL; Sankosh River, Kamakhaguri, Alipurduar, Jalpaiguri, North Bengal; R. P. Barman and party; 27.viii.2008.

Distribution: India: West Bengal, Bihar, Assam, Meghalaya, Tripura, Jammu and Kashmir and Uttaranchal. Bangladesh, Nepal, Myanmar and Pakistan.



Habitat and Ecology: Mountain streams and ponds.

Maximum size: 335 mm TL.

Endemism: Not endemic.

Conservation status: Endangered (Lakra *et. al*, 2010).

Protective measures taken: No measures taken yet.

Recommendations: Habitat loss and degradation of this species should be monitored. Poisoning of the water body should be monitored and strictly prohibited. Poisoning and explosion in the hill streams are sometimes used for catching hill stream fishes. These methods are very destructive, so these should be monitored and prohibited by law to save fishes and other aquatic animals harbouring in mountain streams and ponds.

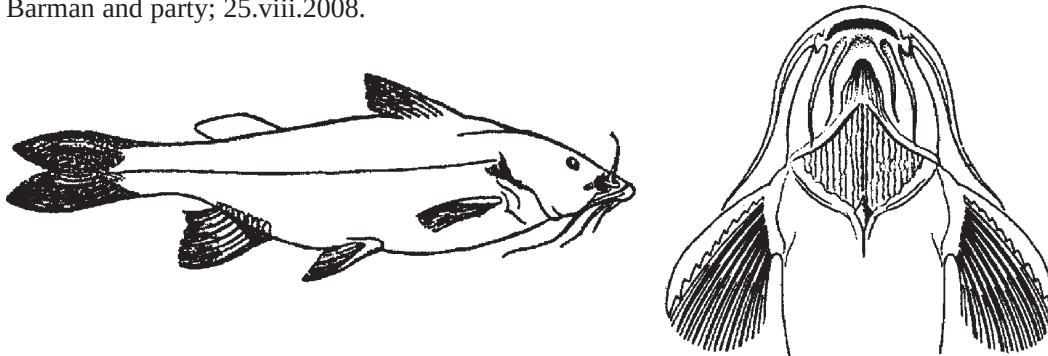
44. *Glyptothorax indicus* Talwar & Jhingran, 1991

1991. *Glyptothorax indicus* Talwar and Jhingran, *Inland Fishes of India*, 2: 654, fig. 210 (Terai, North Bengal).

2006. *Glyptothorax indicus*: Jayaram, *Catfishes of India*: 228-229.

Vernacular names: Nil.

Materials examined: (i) 1 ex., 112 mm SL; Alipurduar, Jalpaiguri, North Bengal; R. P. Barman and party; 25.viii.2008.



Distribution: India: Sone river, Bihar, Moga, East Punjab; Terai of eastern Himalayas, Kosi, Rihand rivers in Uttar Pradesh, Ghaggar river in Punjab, Nepal.

Habitat and Ecology: Mountain streams.

Conservation status: Vulnerable (Molur & Walker, 1998).

Maximum size: 11.0 cm SL.

Endemism: Not endemic.

Protective measures taken: No measures taken yet.

Recommendations: Habitat loss and degradation of this species should be monitored and controlled. Poisoning and pollution of the water body should be monitored and strictly prohibited to save this species.

45. *Glyptothorax telchitta* (Hamilton, 1822)

1822. *Pimelodus telchitta* Hamilton, *Fish. Ganges*: 185, 378 (Freshwater river of Bengal and Bihar).

2006. *Glyptothorax telchitta*: Jayaram, *Catfishes of India*: 252-253.

Vernacular names: Nil.

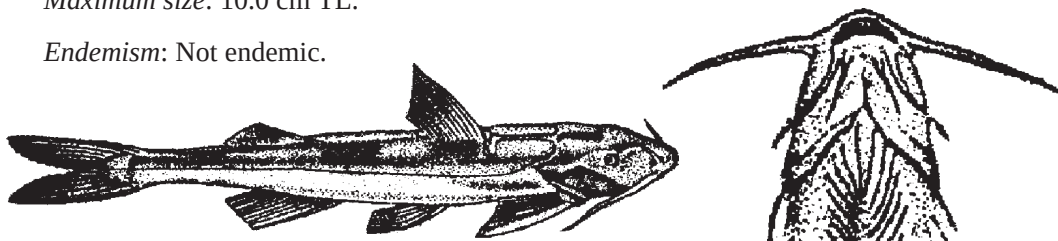
Materials examined: (i) 1 ex., 90 mm SL; Darjeeling, North Bengal; R. P. Barman and party; 06.ix.2008. (ii) 1 ex., 75 mm SL; Lataguri fish market, Jalpaiguri district, North Bengal; R. P. Barman and party; 26.i.2010.

Distribution: India: Vindhaya, Madhya Pradesh, North Bihar and North Bengal. Bangladesh, Nepal, Pakistan.

Habitat and Ecology: Mountain rapids.

Maximum size: 10.0 cm TL.

Endemism: Not endemic.



Conservation status: Vulnerable (Lakra et. al, 2010).

Protective measures taken: No measures taken yet.

Recommendations: Pollution and habitat degradation of this species should be monitored. Poisoning of the mountainous streams and rapids should be monitored and strictly prohibited to save and preserve this species.

46. ***Nangra nangra*** (Hamilton, 1822)
(Kosi nangra)

1822. *Pimelodus nangra* Hamilton, *Fish. Ganges*: 193,378, pl.11, fig.63 (River Kosi).

2006. *Nangra nangra*: Jayaram, *Catfishes of India*: 182-184.

Vernacular names: Nil.

Materials examined: (i) 3 exs., 53-94 mm SL; Alipurduar, Jalpaiguri district, North Bengal; R. P. Barman and party; 25.viii.2008. (ii) 2 exs., 54-57 mm SL; Tista River, Jalpaiguri district, North Bengal; R. P. Barman and party; 31.viii.2008. (iii) 4 exs., 50-61 mm SL; Darjeeling, North Bengal; R. P. Barman and party; 06.09.2008. (iv) 1 ex., 75 mm SL; Lataguri fish market, Jalpaiguri district, North Bengal; R. P. Barman and party; 26.i.2010.

Distribution: India: Ganga, Hoogly, Kosi and Yamuna rivers. Bangladesh, Nepal, Pakistan: Indus.

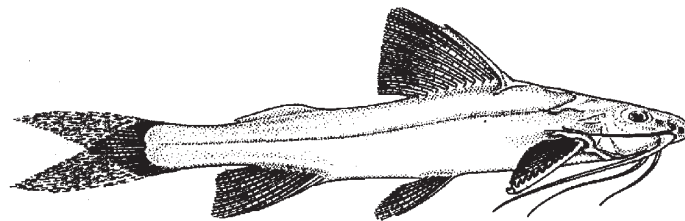
Habitat and Ecology: Higher reaches of rivers.

Maximum size: 5.5 cm TL.

Endemism: Not endemic.

Conservation Status: Vulnerable (Lakra *et. al*, 2010).

Protective measures taken: No measures taken yet.



Recommendations: Indiscriminate fishing of this species should be monitored. Poisoning of the higher reaches of rivers is sometimes used for catching fishes. This is a destructive process which should be monitored and strictly prohibited.

47. ***Parachiloganis hodgarti*** (Hora, 1923)
(Torrent catfish)

1923. *Glyptosternum hodgarti* Hora, *Rec. Indian Mus.*, 25: 38 (Pharping, Nepal; rivers below Darjeeling; the Abor Hills).

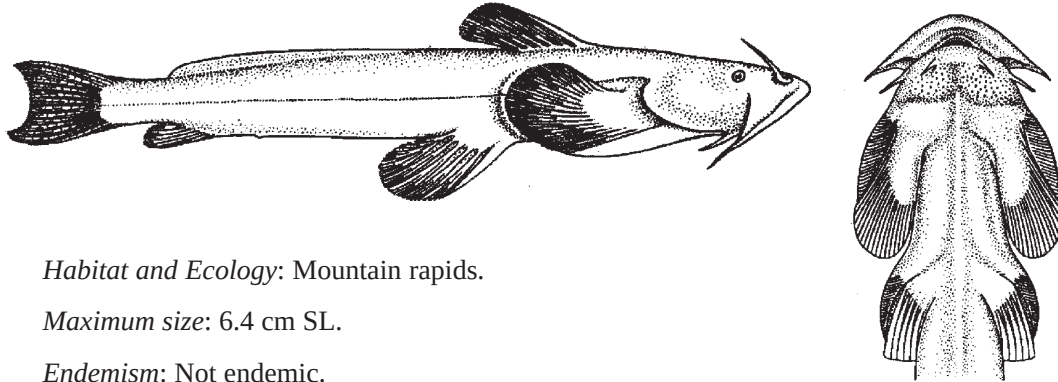
2006. *Parachiloganis hodgarti*: Jayaram, *Catfishes of India*: 273-274.

Vernacular names: Til kabri.

Vernacular name: Torrent catfish.

Materials examined: (iii) 3 ex., 55-65 mm SL; Darjeeling, North Bengal; R. P. Barman and party; 06.ix.2008.

Distribution: India: Assam, Abor Hills, Teesta valley, Kurseong, Darjeeling, West Bengal, Kameng division, Arunachal Pradesh. Bangladesh and Nepal, Pharping.



Habitat and Ecology: Mountain rapids.

Maximum size: 6.4 cm SL.

Endemism: Not endemic.

Conservation status: Vulnerable (Molur & Walker, 1998).

Protective measures taken: No measures taken yet.

Recommendations: Habitat loss and degradation should be monitored and controlled. Indiscriminate fishing of this species also should be monitored. Poisoning of the mountainous streams and rapids are sometimes used for catching fishes of that region. It is a destructive process, so it should be monitored and strictly prohibited.

48. *Pseudecheneis sulcata* (McClelland, 1842)
(Sucker throat catfish)

1842. *Glyptosternum salcatus* McClelland, *Calcutta J. Nat. Hist.*, 2: 587, pl. 6 (Khasi Hills, Assam)

2006. *Pseudecheneis sulcata*: Jayaram, *Catfishes of India*: 275-276.

Vernacular names: Kabri.

Materials examined: (i) 2 ex., 53-68 mm SL; Darjeeling, North Bengal; R. P. Barman and party; 06.ix.2008.

Distribution: India: Assam, Khasi Hills, Riyang river, Darjeeling, West Bengal; Meghalaya, Manipur. Nepal: Kosi River. Arunachal Pradesh: rivers of Kameng, Lohit and Siang. Bangladesh.

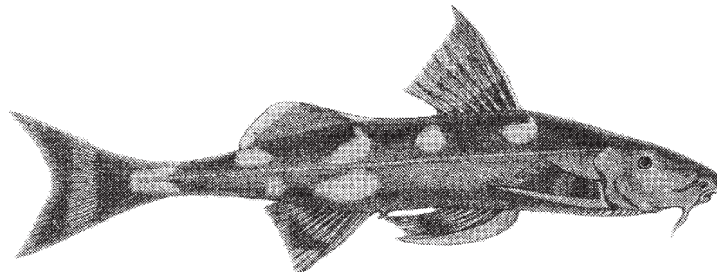
Habitat and Ecology: Mountain rapids.

Maximum size: 20 cm TL.

Endemism: Not endemic.

Conservation status:
Vulnerable (Lakra *et. al*, 2010).

Protective measures taken: No measures taken yet.



Recommendations: Poisoning and explosion in the hill streams are sometimes used for catching fishes of mountain rapids. These methods are very destructive, so these should be monitored and prohibited by law to save fishes and other aquatic animals living in these water bodies.

49. *Sisor rhabdophorus* Hamilton, 1822
(Sisor catfish)

1822. *Sisor rhabdophorus* Hamilton, *Fish Ganges*: 208, 379 (Northern rivers of Bihar and Bengal).

2006. *Sisor rhabdophorus*: Jayaram, *Catfishes of India*: 170-172.

Vernacular names: Nil.

Materials examined: No specimen was found during the surveys. It was recorded from North Bengal by Shaw and Shebbeare (1937).

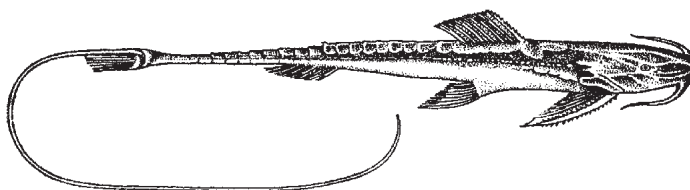
Habitat and Ecology: Sandy beds of clear surface flowing rivers and large streams at foot hills.

Maximum size: 20 cm TL.

Endemism: Not endemic.

Conservation status:
Endangered (Lakra *et. al*, 2010).

Protective measures taken:
Not taken.



Recommendations: Habitat loss and degradation as well as indiscriminate fishing of this species should be monitored. Poisoning of the mountainous streams and rapids should be monitored and strictly prohibited to save and protect this species.

Family 13: ERETHISTIDAE (Erethistid catfish)

50. *Erethistoides sicula* Ng, 2005

2005. *Erethistoides sicula* Ng *Zootaxa*, **1021**: 1-12 (Schutunga River (a tributary of Mansai River) at Ansole)

Vernacular names: Nil.

Materials examined: No specimen examined. This species was recorded from North Bengal by Ng (2005).

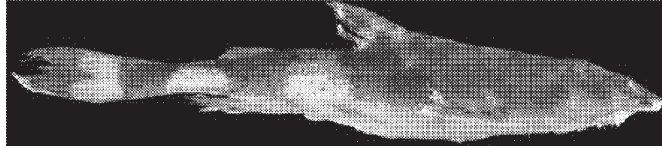
Distribution: India: So far known from the Mansai River drainage, itself a tributary of the Brahmaputra River in northern West Bengal.

Habitat and Ecology: Shallow fast flowing stream with a sandy bottom. This species generally remain hiding in clumps of aquatic vegetation.

Maximum size: 39 mm SL.

Endemism: Endemic.

Conservation status: Data deficient.



Protective measures taken: No measures taken yet.

Recommendations: Habitat alteration should be prohibited as far as it is possible. Poisoning and explosion in the hill streams are sometimes used for catching hill stream fishes. These methods are very destructive, so these should be monitored and prohibited by law to save fishes and other aquatic animals harbouring in hill streams.

Remarks: *Erethistoides sicula*, is described from the Brahmaputra River drainage in northeast India. *Erethistoides sicula* differs from both *E. montana* and *E. pipri* in having a longer caudal peduncle (19.6–22 vs. 14.4–18.4% of standard length) and shorter pectoral spine (14.6–28.0 vs. 30.7–32.1 % of standard length). It further differs from *E. montana* in having a dorsally projecting bony splint on the opercle immediately posterior to its articular facet with the hyomandibula (vs. splint absent) and from *E. pipri* in having a more slender head (13.4–15.1 vs. 16.4 of standard length) (Ng, 2005).

51. ***Hara horai*** Misra, 1976
(Terai hara)

1976. *Hara horai* Misra, *Fauna India, Pisces*, 3, (2nd ed.): 245, pl. 9, fig.1 (Terai, Duars, North Bengal)

2006. *Hara harai*: Jayaram, *Catfishes of India*: 289-290.

Vernacular names: Gagot.

Materials examined: (i) 3 ex. 33-38 mm SL; Rajabkathawa, Alipurduar, Jalpaiguri district, North Bengal; R. P. Barman and party; 23.i.2010.

Distribution: India: Arunachal Pradesh, Bihar, Manipur and North Bengal (Terai and Duars).

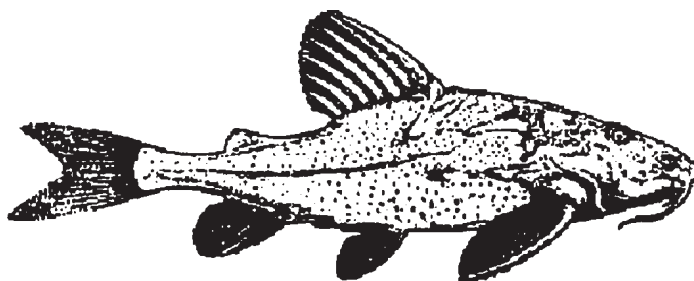
Habitat and Ecology: Rivers and streams of Terai and Duars.

Maximum size: 8.0 cm SL.

Endemism: Not endemic.

Conservation status: Endangered (Molur & Walker, 1998).

Protective measures taken: No measures taken yet.



Recommendations: Habitat loss and degradation as well as pollution of the water body of this species should be monitored. Poisoning of the mountainous streams and rapids should be monitored and strictly prohibited.

52. *Pseudolaguvia ferruginea* Ng, 2009

2009. *Pseudolaguvia ferruginea* Ng Ichthyol. Explor. Freshwaters, **20** (3) : 278-282 (Raidak I River at Shipra, just outside Buxa Tiger Reserve approximately 8 km towards Barobisha on Siliguri-Gauhati Road)

Vernacular names: Nil.

Materials examined: No specimen examined. The author of this species recorded it from North Bengal.

Distribution: India: North Bengal.

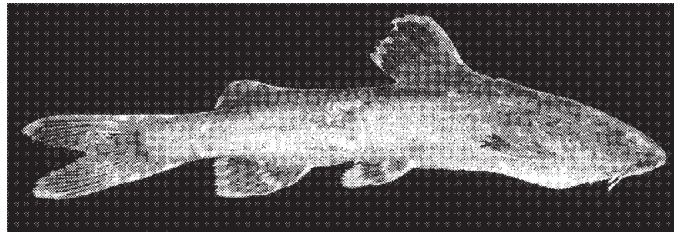
Habitat and Ecology: Small River with clear water and a bottom consisting of gravel and sand.

Maximum size: 27.5 mm SL.

Endemism: Endemic.

Conservation status: Data deficient.

Protective measures taken: No measures taken yet.



Recommendations: Habitat alteration should be prohibited as far as it is possible. Poisoning and explosion in the hill streams are sometimes used for catching hill stream fishes. These methods are very destructive, so these should be monitored and prohibited by law to save fishes and other aquatic animals harbouring in hill streams.

Remarks: *Pseudolaguvia ferruginea* differs from congeners except for *P. jerula*, *P. flavida*, *P. foveolata* and *P. muricata* in having a more slender, elongate body (manifested as a smaller body depth at anus: 10.5-12.4 vs. 12.8-18.4 % of standard length). It is distinguished from *P. jerula* in having a longer dorsal-fin base (14.9-17.3 vs. 7.9-11.9 % of standard length) and wider head (20.1-22.2 vs. 17.1-19.9 % of standard length), and from *P. flavida* in having a smooth (vs. serrated) anterior edge of the dorsal spine. It differs from *P. foveolata* in having a longer thoracic adhesive apparatus (reaching to midway between bases of last pectoral-fin ray and first pelvic-fin ray vs. middle of pectoral-fin base) and a shorter and deeper caudal peduncle (depth 2.4-2.8 times in its length vs. 4.1) and from *P. muricata* in having shorter dorsal (13.0-16.6 vs. 21.2-26.7 % of standard length) and pectoral spines (16.3-18.8 vs. 26.8-35.7 % of standard length), a longer caudal peduncle (16.5-20.0 vs. 12.6-15.7 % of standard length) and more vertebrae (31-32 vs. 28-30). *Pseudolaguvia ferruginea* also differs from all congeners except *P. ferula* and *P. flavida* in having a longer dorsal to adipose distance (14.2-17.3 % of

standard length vs. in contact or up to 14.0 % of standard length). It is further distinguished from *P. kapuri* and *P. ribeiroi* in having a smooth (vs. serrated) anterior edge of the dorsal spine.

53. *Pseudolaguvia ferula* Ng, 2006

2006. *Pseudolaguvia ferula* Ng, *Zootaxa*, **1229**: 59-68 (Tista River at Tista Barrage, West Bengal)

Vernacular names: Nil.

Materials examined: No specimen examined. The author recorded this species from North Bengal (Ng, 2006).

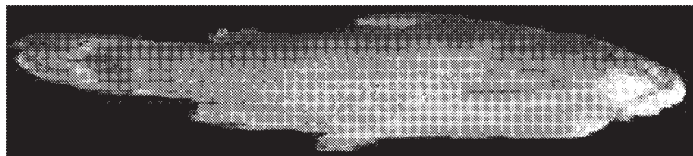
Distribution: India: North Bengal: Tista river.

Habitat and Ecology: Swift flowing river with a mixed rocky / sandy bottom.

Maximum size: 25.4 mm SL.

Endemism: Endemic.

Conservation status: Data



deficient.

Protective measures taken: No measures taken yet.

Recommendations: Habitat alteration is to be prohibited and over-harvesting is to be controlled. Poisoning and explosion in the hill streams are sometimes used for catching hill stream fishes. These methods are very destructive, so these should be monitored and prohibited by law to save fishes and other aquatic animals harbouring in hill streams.

Remarks: *Pseudolaguvia ferula* is described from the Brahmaputra River drainage in India. It can be distinguished from congeners in having a smooth, tapering and cylindrical body (vs. depressed head and body), manifested in the narrower head width (17.1–19 vs. 19.4–23.4 % of standard length), a smaller anterior fontanel (about one third the length of the frontals vs. at least half the length), and very faint, poorly contrasting cream bands that are sometimes absent on some individuals (vs. sharply contrasting cream bands on a brown body). It can be further distinguished from congeners in having a unique combination of the following characters: dorsal-spine length 17.3–18.7% of standard length, pectoral-spine length 20.2–24.3 % of standard length, pelvic-fin length 13.0–14.7 % of standard length, length of adipose-fin base 11.5–13.0 % of standard length, caudal peduncle depth 6.9–7.8 % of standard length, body depth at anus 12.1–13.8 % standard length, eye diameter 8.6–11.7 % of head length, vertebrae 28–30, and thoracic adhesive apparatus reaching to midway between bases of last pectoral-fin ray and first pelvic-fin ray with its unculiferous ridges joined at their posterior ends.

54. *Pseudolaguvia foveolata* Ng, 2006

2006. *Pseudolaguvia foveolata* Ng, *Ichthyol.Explor. Freshwaters*, **16** (2):173-178 (Tista river at Tista Barrage, North Bengal, India).

Vernacular names: Nil.

Materials examined: No specimen examined. This species has been recorded from North Bengal by Ng (2006).

Distribution: India: so far known from Tista River, a tributary of the Brahmaputra River in North Bengal.

Habitat and Ecology: turbid River with mixed rocky and sandy bottom.

Maximum size: 30.0 mm SL.

Endemism: Endemic.

Conservation status: Data deficient.



Protective measures taken: No measures taken yet.

Recommendations: Habitat alteration is to be prohibited and over-harvesting is to be controlled. Poisoning and explosion in the hill streams are sometimes used for catching hill stream fishes. These methods are very destructive, so these should be monitored and prohibited by law to save fishes and other aquatic animals harbouring in hill streams.

Remarks: *Pseudolaguvia foveolata* is described from the Brahmaputra River drainage in northeast India. It differs from congeners in having a shorter thoracic adhesive apparatus (reaching to middle of pectoral-fin base), a more slender, more elongate body, a longer adipose-fin base, a smooth anterior edge of the dorsal spine, short maxillary barbels and the adipose fin not reaching the base of the last dorsal-fin ray (Ng, 2006).

55. *Pseudolaguvia shawi* Hora, 1921

1921. *Laguvia shawi* Hora, *Rec. Indian Mus.*, **22**: 740, pl.29, fig.2 (Mahananda River, Sivoke River).

2005. *Pseudolaguvia shawi*: Ng, H.H. and M. Kottelat. *Ichthyol. Explor. Freshwat.* 16(1):20.

Vernacular names: Nil.

Materials examined: (i) 1 ex., 85 mm SL; Tista river, Jalpaiguri, North Bengal; R. P. Barman and party; 31.viii.2008.

Distribution: India: Mahananda, Sivoke rivers, Darjeeling, Kalimpong Duars, Siliguri, Terai, North Bengal, Sikkim.

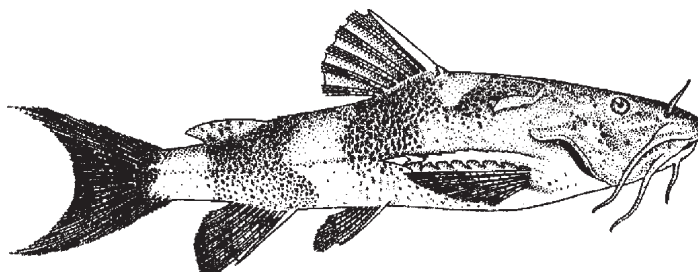
Habitat and Ecology: Mountain rapids.

Maximum size: 30 mm TL.

Endemism: Not endemic.

Conservation status:
Endangered. (Molur & Walker, 1998).

Protective measures taken:
No measures taken yet.



Recommendations: Habitat loss and degradation of this should be monitored and controlled. Indiscriminate fishing of this species should be monitored. Poisoning of the mountainous streams and rapids should be monitored and strictly prohibited since it is a destructive process which kills all the aquatic animals living there.

Family 14: CHACIDAE

56. *Chaca chaca* (Hamilton, 1822)

1822. *Platystacus chaca* Hamilton, *Fish Ganges*: 140, 374, pl.28, fig.43 (Rivers and ponds of the north eastern Bengal).

2006. *Chaca chaca*: Jayaram, *Catfishes of India*: 318-319.

Vernacular names: Chaca.

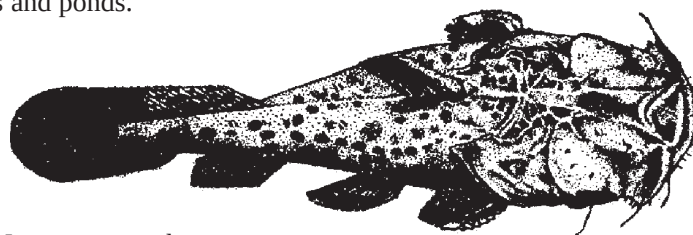
Materials examined: (i) 1 ex., 145 mm SL; Neora River, Lataguri, Jalpaiguri district, North Bengal; R. P. Barman and party; 28.i.2010.

Habitat and Ecology: Rivers and ponds.

Maximum size: 20.0 cm TL.

Endemism: Not endemic.

Conservation status:
Endangered (Lakra *et. al*, 2010).



Protective measures taken: No measures taken yet.

Recommendations: Pollution and poisoning of the water bodies where this found to occur should be monitored and controlled. Indiscriminate fishing of this species should be monitored. Habitat alteration of this species should be monitored and strictly prohibited.

Family 15: OLYRIDAE (Longtail catfish)

57. *Olyra longicaudata* McClelland, 1842

1842. *Olyra longicaudata* McClelland, *Calcutta J. nat. Hist.*, 2: 588, tab 21, fig.1 (Khasi Hills, Meghalaya)

2006. *Olyra longicaudata*: Jayaram, *Catfishes of India*: 94-95.

Vernacular names: Nil.

Materials examined: (i) 3 ex., 53-94 mm SL; Alipurduar, Jalpaiguri district, North Bengal; R. P. Barman and party; 25.viii.2008. (ii) 2 ex., 85-88 mm SL; Lataguri fish market, Jalpaiguri district, North Bengal; R. P. Barman and party; 26.i.2010.

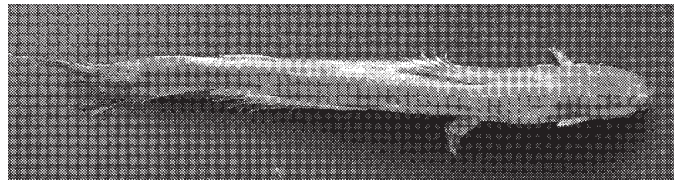
Distribution: India: Assam, base of Darjeeling Himalayas, West Bengal; Meghalaya. Myanmar.

Habitat and Ecology: Rocky hill-streams.

Maximum size: 7.5 cm TL.

Endemism: Not endemic.

Conservation status:
Vulnerable (Lakra *et. al*, 2010).



Protective measures taken: No measures taken yet.

Recommendations: Poisoning of the mountainous streams and rapids should be monitored and strictly prohibited since it is a destructive process which kills all aquatic animals occurring there.

Order VII: Mugiliformes

Family 16 MUGILIDAE (Mullet)

58. *Rhinomugil corsula* (Hamilton, 1822) (Corsula mullet)

1822. *Mugil corsula* Hamilton, *Fish Ganges*: 221,381, pl.9, fig.97 (Rivers of the Gangetic Provinces in the southern part of Bengal).

1999. *Rhinomugil corsula*: Menon, *Rec. zool. Surv. India Occ. Paper No. 175*: 293.

Vernacular names: Corsula / Kanua.

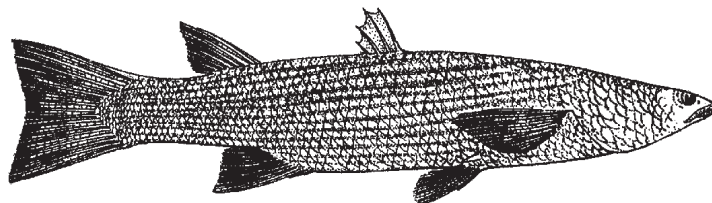
Materials examined: 2 ex. 180-210 mm SL; Torsa river, Cooch Behar, North Bengal; R.P.Barman and party; 28.viii.208.

Distribution: India, Pakistan, Nepal, Bangladesh and Myanmar.

Habitat and Ecology:
Rivers and estuaries, occurs above tidal influence in freshwaters.

Maximum size: 45 cm TL.

Endemism: Not endemic.



Conservation status: Vulnerable (Lakra *et. al*, 2010).

Protective measures taken: No measures taken yet.

Recommendations: Over fishing of this species should be monitored. Habitat alteration should be monitored and strictly prohibited.

59. ***Sicamugil cascasia*** (Hamilton, 1822)
(Yellow tail mullet)

1822. *Mugil cascasia* Hamilton, *Fish Ganges*: 217, 380 (Northern rivers of Bengal).

1999. *Sicamugil cascasia*: Menon, *Rec. zool. Surv. India, Occ. Paper No. 175*: 293.

Vernacular names: Parshay.

Materials examined: 1 ex. 210 mm SL; Torsa river, Cooch Behar, North Bengal; R.P.Barman and party; 28.viii.2008.

Distribution: India: upper reaches of Ganga, Yamuna and Brahmaputra. Pakistan: Indus system. Bangladesh.

Habitat and Ecology: Rivers in the upper reaches.

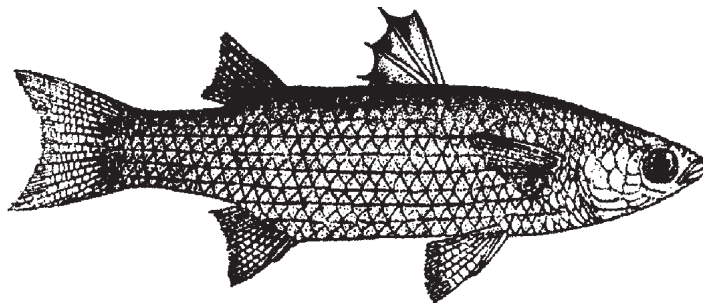
Maximum size: 10.0 cm TL.

Endemism: Not endemic.

Conservation status:
Vulnerable (Lakra *et. al*, 2010).

Protective measures taken:
No measures taken yet.

Recommendations: Over fishing of this species should be monitored. Habitat alteration should be monitored and strictly prohibited.



Order VIII: PERCIFORMES

Family 17: BADIDAE

60. ***Badis badis*** (Hamilton, 1822)
(Gangetic koi)

1822. *Labrus badis* Hamilton, *Fish Ganges*: 70-72, 368, pl.25, fig.23 (Ponds and ditches throughout the Gangetic Provinces).

1999. *Badis badis*: Menon, *Rec. zool. Surv. India, Occ. Paper No. 175*: 289-290.

Vernacular names: Koi.

Materials examined: (i) 2 ex., 28-42 mm SL; Alipurduar, Jalpaiguri district, North Bengal; R. P. Barman and party; 25.viii.2008. (ii) 1 ex., 40 mm SL; Darjeeling, North Bengal; R. P. Barman and party; 06.ix.2008. (iii) 4 ex., 32-41 mm SL; Neora River, Lataguri, Jalpaiguri district, North Bengal; R. P. Barman and party; 28.i.2010.

Distribution: India, Pakistan, Bangladesh, Nepal and Myanmar.

Habitat and Ecology: Rivers, Ponds and ditches.

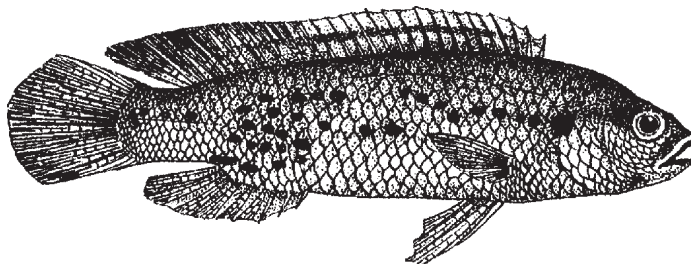
Maximum size: 90 mm TL.

Endemism: Not endemic.

Conservation status: Vulnerable (Lakra *et. al*, 2010).

Protective measures taken: No measures taken yet.

Recommendations: Habitat alteration and pollution of the water bodies where this species occurs should be monitored and strictly prohibited.



Family 18: OSPHRONEMIDAE

61. *Ctenops nobilis* McClelland, 1845

1845. *Ctenops nobilis* McClelland, *Calcutta, J. nat. Hist.*, 5: 281, pl.21., fig. 1 (River at Sikkim, N. Bengal)

1999. *Ctenops nobilis*: Menon, *Rec. zool. Surv. India, Occ. Paper No. 175*: 299-300.

Vernacular names: Nil.

Materials examined: (i) 3 ex., 43-65 mm SL; Alipurduar, Jalpaiguri district, North Bengal; R. P. Barman and party; 25.viii.2008.

Distribution: India: North eastern India. Bangladesh.

Habitat and Ecology: Freshwater Rivers and lakes with overgrown vegetation.

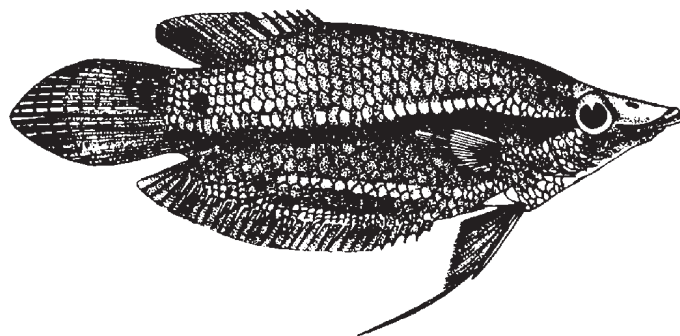
Maximum size: 10.0 cm TL.

Endemism: Not endemic.

Conservation status: Vulnerable (Lakra *et. al*, 2010).

Protective measures taken: No measures taken yet.

Recommendations: Habitat



alteration should be monitored and strictly prohibited. Pollution of the water bodies where this species occurs should be monitored and controlled.

Family 19: CHANNIDAE (Murrels)

62. ***Channa amphibeus*** (McClelland, 1845)
(Borna snakehead)

1845. *Ophiocephalus amphibius* McClelland, Calcutta, J. nat. Hist., 5: 275 (River Chail, a tributary of Brahmaputra, Bhutan).

2009. *Channa amphibeus*: Vishwanath and Geetakumari, *Journal of Threatened Taxa*, 1(2): 98.

Vernacular names: Bora-cheng, Borna.

Materials examined: No specimen was collected during the surveys. It was recorded from North Bengal by Shaw and Shebbeare (1937).

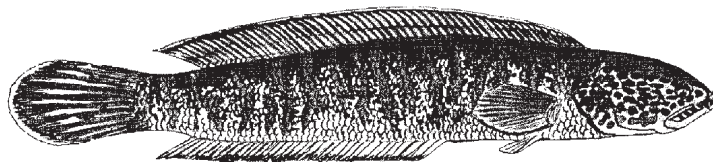
Distribution: India: North Bengal. Bhutan.

Habitat and Ecology: Freshwater Rivers.

Maximum size: 90 cm TL.

Endemism: Not endemic.

Conservation status:
Vulnerable (Lakra *et. al*, 2010).



Protective measures taken: No measure taken yet.

Recommendations: This species has been threatened primarily due to habitat alteration and degradation in addition to overexploitation. So, conservation measures are to be taken keeping these facts in mind.

Remarks: This species has been often confused with *Channa barca*. It can be easily separated having 80 to 81 scales from *C. barca* which possess 60 to 65 scales in lateral line.

63. ***Channa barca*** (Hamilton, 1822)
(Barca snakehead)

1822. *Ophiocephalus barca* Hamilton, *Fish Ganges*: 67, 367, pl. 135, fig. 20 (River Brahmaputra, near Goalpara, Assam).

1999. *Channa barca*: Menon, *Rec. zool. Surv. India, Occ. Paper No. 175*: 272-273.

Vernacular names: Cheng, Bora-cheng.

Materials examined: (i) 1 ex., 185 mm SL; Kaljani River, Salsabari, Alipurduar, Jalpaiguri district, North Bengal; R. P. Barman and party; 26.viii.2008.

Distribution: India: West Bengal and Assam and Bangladesh.

Habitat and Ecology: Large freshwater rivers.

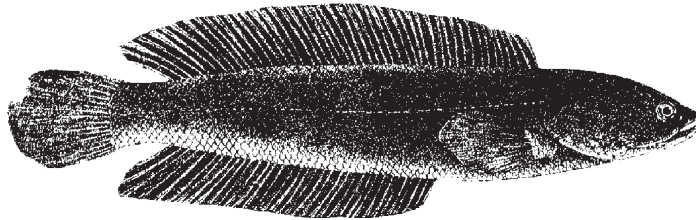
Maximum size: 90 cm TL.

Endemism: Not endemic.

Conservation status: Vulnerable (Lakra *et. al*, 2010).

Protective measures taken: No measure taken yet.

Recommendations: This snakehead fishes have also become threatened due to habitat degradation and overexploitation. So, conservation measures are to be taken keeping these two facts in mind.



DISCUSSIONS

This work has identified 63 threatened and endemic species belonging to 49 genera, 19 families and 7 orders occurring in the freshwater bodies of North Bengal. The present study identified 11 endemic fish species of North Bengal, of which two species are considered under threatened category. The eleven endemic species which have restricted distribution confined to North Bengal are as follows: *Barilius howesi* Barman, *Danionella priapus* Britz, *Oreochthys crenuchoides* Schafer, *Aborichthys elongatus* (Hora), *Pangio apoda* Britz & MacLaine, *Batasio fasciolatus* Ng, *Amblyceps cerinum* Ng & Wright, *Erethistoides sicula* Ng, *Pseudolaguvia ferruginea* Ng, *P. ferula* Ng and *P. faveolata* Ng. Two endemic species which are considered under threatened category are *Barilius howesi* and *Aborichthys elongatus*. There are a number of cold water species found to occur in North Bengal. Some of important species are namely: *Neolissocheilus hexagonolepis*, *Raiamas bola*, *Schoizothorax richardsonii*, *Tor putitora*, *Tor tor* and some Indian hill trouts (species of *Barilius*). These cold water fishes, adapted to a very narrow range of temperature, are the worst effected fishes due global warming. A number of non-indigenous species, viz., *Hypothalmichthys nobilis* (Richardson), *Carassius auratus auratus* (Linnaeus), *Carassius carassius* (Linnaeus), *Ctenopharyngodon idella* (Valenciennes), *Cyprinus carpio carpio* Linnaeus, *Hypophthalmichthys molitrix* (Valenciennes), *Clarias gariepinus* (Burchill) are also found to occur in the water bodies of North Bengal (Barman, 2007). These fishes are also a cause of threat to the native and endemic species of North Bengal as well as India as proved elsewhere.

The fish particularly the freshwater fishes are increasingly threatened due to the fact that they usually inhabit in relatively small water bodies. These aquatic animals are also being affected due to habitat loss and degradation. Damming, shrinkage, draining and landfills of wetlands, agricultural and industrial expansions, excessive use of chemical fertilizer and pesticides, effluents

flowing from towns, cities and different nearby factories, mining and removal of sand and stones and pollution of the water bodies contributes to the habitat destruction and degradation. They are also threatened because of destructive methods of fishing and over exploitation. Further, introduction of alien species also contribute to threats to native and endemic freshwater fish species. In addition to these factors, recently their living environment has becoming uninhabitable due to global warming and climate change. Fishes are more sensitive to temperature than many animals because they cannot maintain a constant body temperature like warm blooded animals. The body temperature of the fish is exactly the same temperature where they occur. Different species can live in very cold or very hot water, but each species has a range of temperatures tolerance and fish can't survive in temperatures too far out of this range. Naturally, when fish find themselves in hot water, they migrate in search of cooler locality. As global temperatures rise, some fish may be able to shift locally by moving deeper or by heading upriver towards cool headwaters. Since freshwater fish are geographically isolated their ability to move to cooler region of the water body is very much restricted. Freshwater species that cannot migrate to cooler waters as temperatures rise may be stuck in hot water. Migration may be impossible from many isolated lakes and wetlands but that also in a very limited areas. Native fishes are already living near their thermal tolerance limits in some of the hottest free-flowing water on earth. It is expected that under the climate change scenario several species may be killed by even a slight rise in temperature. The cold water species are uniquely adapted to a very narrow cold water temperature ranges in well oxygenated water. This adaptation has made them vulnerable to even a slight increase in temperature. Slight warmer water may be insignificant to warm blooded animals but its effect on cold blooded animals like fish and on aquatic ecosystems will be damaging and ultimately on the country as a whole, on the global food supply and economic stability are likely to be very far reaching effect. The cold water fishes are extremely sensitive to change in water temperature. The fish community of cold water region can potentially experience slower growth rate, lower oxygen content in the water and greater susceptibility to poisons, parasites and diseases. If the water remains too warm for too long period, the water bodies where they normally live will no longer provide a suitable home for them. Mahaseers (*Tor* sp) including Copper or chocolate mahaseer (*Neolissocheilus hexagonolepis*), snow trout (*Schizothorax* sp) and Indian hill trout (*Barilus* sp.) are the principal cold water fish species inhabiting mountain streams of North Bengal under threat. Mahaseers constitute one of the important cold water fisheries of India, now are being restricted in the temple tanks spread throughout in the colder region of the country. They are one of the important game fishes of India. The snow trout (*Schizothorax richardsonii*) starts upward migration with the rise in temperature during summer months (March to May). During upstream migration the fish still finds itself in waters of low temperature due to the steady inflow of snow melted waters from the mountains of the Himalayan region. But due to global warming the glaciers on the great Himalayan region are also shrinking their extensions. So the fate of the fish inhabiting the glacier fed rivers and water bodies of North India remains to be debatable.

Scientists are of the opinion that increased warming could lead to the extinction of up to 20 per cent species that are found nowhere else in the world. In this context our country is also not lagging behind this situation. Almost 50 per cent of the freshwater fishes of India are now facing the threats of extinction due to over fishing or over exploitation, pollution, invasive alien species and habitat loss and degradation.

Human induced climate change is increasingly recognized as serious threats to both the terrestrial and aquatic animals particularly fishes in general accounting almost 99 per cent responsible for the threatened species. Climate change is altering and restricting the movement of migratory species and their behavioural pattern and biology of many species due to global warming. It may be mentioned here that threat process are dynamic and change over time. It is also equally true that extinction of species is actually a natural phenomenon. The previous extinctions were due to natural causes over a long period of time but now it has been enhanced due to the activities of mankind over a short period of time. Since the present global warming is largely due to the emission of green house gases, the industrialized countries must cut their green house gases, specially the carbon dioxide emissions as obliged under the Kyoto Protocol and all must agree to much more serious emission reductions in the next period after 2012. The single largest source of man-made green house gas like carbon dioxide is due to electricity generation by burning of fossil fuel, accounting for 37% of worldwide carbon dioxide emissions. So, to save our threatened and endemic fish species the mitigation options to control global warming are to be adopted seriously.

THREATS AND STRATEGIES FOR CONSERVATION

The present study shows that North Bengal possesses 63 threatened and endemic freshwater fish species of India under 49 genera, 19 families and 7 orders. It may be mentioned here that the fish fauna of India has been studied recently by the fish workers of our institution during the preparation of the Red Book on the fishes of India. The present study on the fishes of North Bengal is a part of that work. Considering all the threatened and endemic freshwater fishes of North Bengal and as whole of West Bengal, some conservation measures have already been suggested for their protection and conservation by the senior author (Barman, 2007). Those measures are also furnished here in a generalized concise form since details are already given. The fact is that the conservative measures suggested are not unique to North Bengal instead these are almost similar to the conservative measures needed for protection of the fish fauna occurring in several parts of our country as well as the world also.

(I) Habitat loss and degradation: This is one of the chief threats for the threatened fish species. Human activities have changed the habitat of fish and other aquatic animals in general. Habitat loss has largely been taken place due to human intervention and change in land use pattern. Large scale conversion of natural habitats for a variety of purposes has led to shift fauna and floral distribution pattern almost equally. In North Bengal tea garden has changed the natural habitat of flora and fauna of that region to a great extent. Deforestation, damming the

river systems, shrinkage of wetlands, urbanization and industrialization are some of factors for habitat loss and degradation.

The habitat destruction or change for industrial development and urbanization, hydroelectric purposes, agricultural development or for damming on the course of the river systems affect the growth and production of the fish particularly freshwater fishes, therefore, due consideration should be given to protect and conserve our resident and native fish populations.

(a) Where deforestation is required for the developmental purposes, replantation must be done by the users.

(b) Where water diversion by damming etc are to be done for any reasons proper impact assessment studies have to be conducted.

(c) Regulated development is to be done to avoid shrinkage of wetlands as far as possible.

(II) Over harvesting: Over harvesting or over-exploitation of fishing for food is a major factor for threatening the fish communities in general. Over fishing is a massive threat in the inland sector in particular. To combat over fishing responsible fisheries management is urgently needed.

(III) Indiscriminate fishing: Indiscriminate fishing of the immature and adult fishes throughout the year is another threat. Numerous species of fishes are being destroyed and lost annually during indiscriminate commercial catches. It is to be prohibited introducing proper mesh size of the fishing nets and strictly banning fishing operation during breeding seasons. Regulated fishing practices should be adopted.

(IV) Strict implementation of the laws relating fishing activities: The laws governing the fishing activities are to be implemented very strictly. The contradictory laws and policies of the government to control the fishing operation are to be removed.

(V) Impact on the introduction Exotic species: The impact of the introduction of exotic species in the Indian waters has been proved to be detrimental to the native and endemic fishes of our country. In North Bengal along with other parts of our country several exotic fish species have been introduced without any consideration of the impact of the exotic on the native fish species. Initially such introductions were limited to small confined water bodies but at present they have spread almost everywhere in North Bengal. The fish population is almost 30% in danger for the introduction of the alien species now-a-days. Therefore, proper assessment should be made before introducing any alien species in our country. Moreover our fish production has increased about more than 6 times at present, so import of the exotic species is not now needed.

(VI) Environmental Education /Mass awareness programme: The natural connections among different water bodies during rainy seasons and flooded condition and the dispersal mediated by local people are the major invasion factors for the exotic fishes. The extermination of exotic fishes by available management tools is very difficult due to wide spectrum of water

bodies exploited by the exotic fishes. The campaign of the environmental education or mass awareness programme is very much required to restrict the human induced dispersal of exotic fishes and to conserve the endemic and native fish community in water bodies where the exotic fishes have not invaded.

(VII) Pesticide & agricultural fertilizers: In the tea gardens of duars region of North Bengal huge amount of pesticides are used to protect the tea garden. This has a great damaging effect on the aquatic faunal diversity especially on the fish community of that region. Use of pesticides and agricultural fertilizers should be replaced by use of biodegradable fertilizers.

(VIII) Sewage & industrial pollution: Sewage & industrial pollution drainage to the water bodies are to be monitored. The effluent from the industries must be treated to remove poisonous materials before discharge into the aquatic bodies.

(IX) Fish sanctuary: Certain portions of the major river systems in North Bengal may be declared as freshwater fish sanctuaries like that of the Wildlife Sanctuaries of our country. It has been found that several scattered isolated pools are formed during the summer months along the courses of different rivers and their tributaries. Several important commercial fishes take shelter in these pools until the next onset of the monsoon. During this period fishermen catch these fishes indiscriminately including the brooders, which ultimately destroy the reproduction and multiplication of the fish population. In view of this fact these pools may also be declared as fish sanctuaries. Fish sanctuaries may also be set up in different isolated perennial ponds and lakes throughout North Bengal.

SUMMARY AND THE CONCLUDING REMARKS

The present study identified 63 threatened and endemic species belonging to 49 genera, 19 families and 7 orders in the freshwaters of North Bengal. This study also shows that North Bengal harbours 11 endemic freshwater fish species. Some recommendations have been proposed under each species for the conservation of those species. In addition to these recommendations proposed some common threats and conservation strategies for the conservation of the threatened species have also been furnished in this work.

North Bengal appears to be treasure houses for biodiversity of fishes with new species or interesting species being discovered from the little explored and still pristine mountain streams and water bodies along the sub-Himalayas ranges. Human activities already have pushed many fish species to the brink of extinction. With added stress of global warming and climate change, the result could be devastating equally on the fish community as well as on the human kind. So, let us jointly work and take appropriate measures for the conservation of the freshwater fish biodiversity of North Bengal before it totally goes beyond our control. We are to keep in mind that Humans have been identified as the chief threat to different species of fishes at risk of their extinction. It is to be kept in minds that Fish feeds on another fish when it is hungry. But we, the mankind depend on them for our food, medicine, mental development, longevity and for our

protein, vitamins and minerals and for a number of by-products. We keep them as pets and we thrive by selling them. Actually we are the beneficiary, so we should jointly work for their conservations which will in turn help us for our survival in the age of global warming and climate change scenario of this earth.

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SOME COLLECTION SPOTS IN NORTH BENGAL



Fig. 1.



Fig. 2.



Fig. 3.



Fig. 4.



Fig. 5.



Fig. 6.

Fig. 1-3: Collection Spots at Alipurduar (August, 2008),
Fig. 4-6 : Waterbodies at Coochbihar, where specimens were collected

SOME COLLECTION SPOTS IN NORTH BENGAL



Fig. 7. Native women guiding near collection spot at Coochbehar in a rainy day during collection



Fig. 8. The Palace of Coochbehar

Neora River at Lataguri, Jalpaiguri and camp site



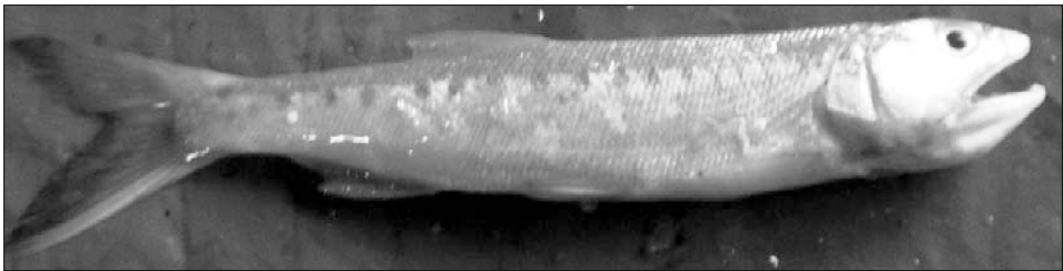
Teesta River near Siliguri



Photographs of Some Freshly Collected Fishes of North Bengal



Barilus barila (Hamilton)



Raimas bola (Hamilton)



Schizothorax richardsonii (Gray)

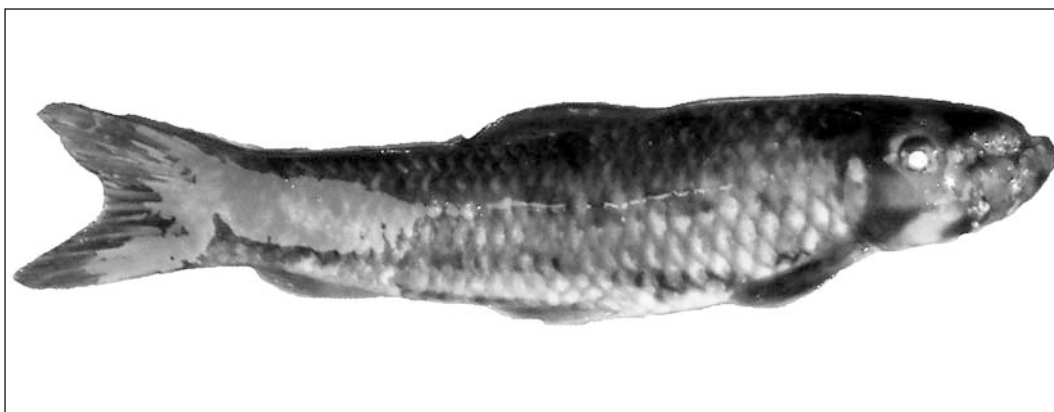
Photographs of Some Freshly Collected Fishes of North Bengal



Chaca chaca (Hamilton)

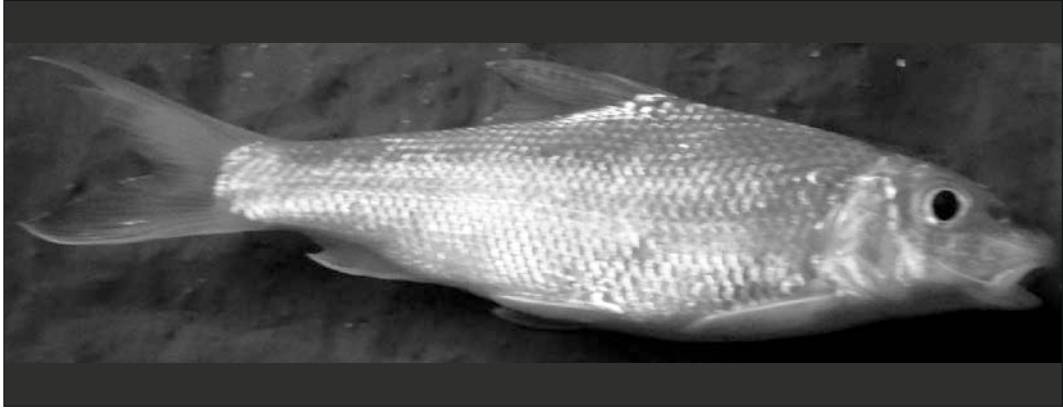


Systomus sarana (Hamilton)



Gara gotyla gotyla (Gray)

Photographs of Some Freshly Collected Fishes of North Bengal



Chagunius chagunio (Hamilton)



Glyptothorax cavia (Hamilton)



Chitala chitala (Hamilton)

