

FISHES OF
RIVER NARMADA

A Field Identification Manual

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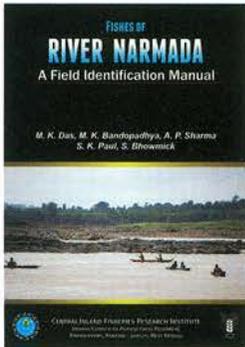


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Preface

The inland fish resource of India are potentially one of the richest in the world. The Indian fish fauna is an assemblage of about 2500 species depicting diverse characteristics of which 930 species belonging to 326 genera inhabit the inland waters. For these valuable aquatic resources, a data base of the available fish species with respect to their morphological, biological and adaptive characters along with their common names is essential for management and conservation.

Though some survey were carried out earlier on fishery in river Narmada, however, an extensive experimental sampling is required for reassessing the fish diversity with reference to water quality and habitat ecology in the changing scenario of river Narmada. Based on the recent study conducted by CIFRI in the river Narmada under the project FHE/ER/07-07/01, a field identification manual of the available fish species has been prepared. It is expected that the publication would serve as a quick identification guide for students, teachers and extension personnel and aquaculturists during field sampling.

Authors

Introduction

The river Narmada a Sanskrit word meaning 'the Giver of Pleasure' is one of the most sacred rivers in India. It is the longest west flowing river rising from a spring at a height of 1057m above MSL on the summit of Amarkantak Hill in Shahdol district of Madhya Pradesh in the Maikal hill range. The total length of the Narmada from its source to its outfall into the Gulf of Cambay in the Bharuch district of Gujarat is 1312 kms. The first 321 kilometres of its course winds among the Mandla Hills, which form the head of the Satpura Range till it reaches Jabalpur where it passes through the 'Marble Rocks' and enters the Narmada plains. The river runs another 745 kilometers through the plains before the Vindhyas and the Satpuras come close to the banks of the river restricting it to a narrow gorge that extends for 87 kilometers first forming the common boundary between Maharashtra and Madhya Pradesh and then between Maharashtra and Gujarat. Thereafter it courses for 159 km in the plains in Gujarat to its draining into the sea .

The Narmada basin, lies between east longitudes 72 degrees 32' to 81 degrees 45' and north latitudes 21 degrees 20' to 23 degrees 45' lying on the northern extremity of the Deccan Plateau and extends over an area of 98,796 km² (38,145.3 sq mi). The basin covers large areas in the states of Madhya Pradesh (86%), Gujarat (14%) and a comparatively smaller area (2%) in Maharashtra. In the river course of 1,312 km (815.2 mi), there are 41 tributaries, out of which 22 are from the Satpuda range and the rest on the right bank are from the Vindhya range.

Earlier report on fishery in river Narmada mention that about 84 fish species were recorded belonging to 23 genera out of which 60% were commercial carp fishes, 35% of cat fishes and 5% of miscellaneous fishes. The present study is based on the fish samples collected in course of our investigations on the ecological integrity assessment of river Narmada under the project FHE/ER/07-07/01. The fishes were caught through different selective and non-selective gears. Fish samples were also collected from adjacent fish landing centres and were photographed in the sampling sites. The collected fishes were identified as per Day (1989), Mishra (1962), Fisher and Bianchi (1984), Talwar and Jhingran (19191) and Jayaram (2006).

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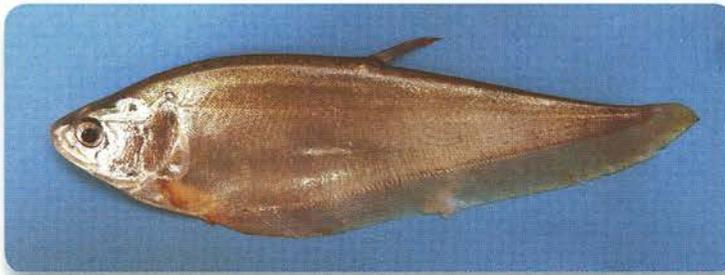
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Order: Osteoglossiformes

- Body strongly compressed
- Dorsal fin small
- Anal fin long and confluent with small caudal fin
- Pectoral fins inserted low on body
- Pelvic fins rudimentary

Family: Notopteridae

- Body deep and compressed
- Eyes large and mouth wide
- Dorsal fin small
- Scales very small
- Pelvic fins rudimentary

Species: *Notopterus notopterus* (Pallas)

Synonyms: *Gymnotus notopterus*, *Notopterus kaporat*, *Notopterus osmani*.

Common Name: Grey featherback (English), Phulo, Phuloi (West Bengal), Pholi, Moh (M.P.), Chalat, Patre (Maharashtra).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: Important food fish. Also considered as aquarium fish.

Identifying Characters: Body strongly compressed. Head compressed and its length about 4.5 times in standard length. Dorsal fin inserted nearer snout-tip than to base of caudal fin. Pectoral fins moderate, extend beyond anal fin origin. Scales minute, considerably larger on opercles than on body. Silvery white with numerous fine grey spots on body.

Habitat Preference: Fresh and brackish waters. In Narmada this species recorded from upper and lower stretches of the river at Mandla, Tilwaraghat and Bhadbhut.

Order: Clupeiformes

- Body compressed
- No dorsal adipose fin
- Abdomen often with keeled scutes.
- Branchiostegal rays 4 to 8

Family: Clupeidae

- Body subcylindrical or strongly compressed
- Gillrakers often numerous, long and slender in most species
- Fins without spines
- Caudal fin deeply forked

Species: *Anodontostoma chacunda* (Hamilton-Buchanan)



Synonyms: *Clupanodon chacunda*, *Clupanodon chanpole*, *Chatoessus chacunda*, *Dorosoma indicus*.

Common Name: Chacunda gizzard-shad (English), Khoira (West Bengal).

Conservation Status (IUCN): Not Evaluated (NE).

Commercial importance: Food fish of less importance.

Identifying Characters: Body deep, mouth inferior, second supra-maxilla a mere splint. Longest gillrakers on lower part of arch less than corresponding gill-filaments. Last dorsal fin-ray not filamentous. Hind edges of scales toothed, the teeth thinner than gaps between them; a median series of pre-dorsal series.

Habitat Preference: Marine, inshore; also in estuaries. Recorded from the lower stretch of the river Narmada at Bhadbhut and Ambetha site.

Species: *Corica soborna* (Hamilton-Buchanan)

Synonyms: *Corica biharensis*.

Common Name: Ganga river-sprat (English), Soborno-khorica (West Bengal).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: Trash fish, often consumed by the people especially in West Bengal.

Identifying Characters: Body silvery, elongated with a faint lateral band. Abdomen keeled with 10 or 11 pre and 7 or 8 post pelvic scutes. Teeth minute or absent. Last two anal fin rays separated from rest of fin forming a distinct finlet.

Habitat Preference: Rivers and estuaries. Sample collected from upper and lower stretches of the river Narmada at Mandla, Tilwaraghat and Bharuch.

Species: *Escualosa thoracata* (Valenciennes)

Synonyms: *Alausa champil*, *Clupea argyrotaenia*, *Clupea coval*, *Kowla coval*, *Kowala thoracata*.

Common Name: White sardine (English), Motwa, Bhanjee (Gujarati).

Conservation Status (IUCN): Not Evaluated (NE).

Commercial importance: Trash fish.

Identifying Characters: Dorsal profile nearly horizontal while ventral profile convex. Snout obtuse, lower jaw slightly the longer. Maxilla reaching the middle of eye. Dorsal origin opposite to pelvic origin. Pelvic fin rays 7. Pre-ventral scutes 16 to 18, post ventral 11 to 12. 38 to 41 scales in lateral series. Golden shot with purple shades are present, a brilliant silvery band along the sides.

Habitat Preference: Estuaries and tidal waters. Species recorded from the lower stretches of the river at Bhadbhut and Ambetha.

Species: *Tenualosa ilisha* (Hamilton-Buchanan)



Synonyms: *Clupanodon ilisha*, *Clupea ilisha*, *Hilsa (Tenualosa) ilisha*, *Macrura ilisha*.

Common Name: Hilsa (English), Palla, Chaksi (Gujarat).

Conservation Status (IUCN): Not Evaluated (NE).

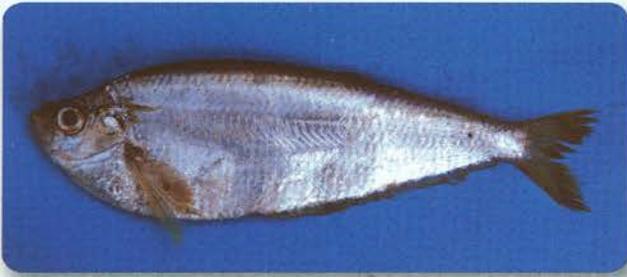
Commercial importance: Important priced food fish of excellent flavour.

Identifying Characters: Dorsal and ventral profile equally convex. Fronto-partial striae weakly developed. Upper jaw with a distinct median notch at centre. Belly with 30-33 scutes. Caudal fin deeply forked as long as head. A dark blotch behind gill opening followed by a series of small spots along flanks in the immature. 37 to 47 scales in lateral series.

Habitat Preference: Marine and pelagic coastal waters. Ascending into rivers during spawning season (Monsoon). The species recorded from the lower stretches of river Narmada at Bharuch and Bhadbhut.

Family: Pristigasteridae

- Body elongated and compressed
- Mouth more or less upwards
- Dorsal fin short or absent, originated behind midpoint of body
- Anal fin with more than 30 fin rays

Species: *Raonda russeliana* (Gray)

Synonyms: *Raonda russelliana*.

Common Name: Raonda (English).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: Food fish of less importance.

Identifying Characters: Body elongate, lower profile convex with sharp keel of 33 to 38 scutes. Mouth pointing obliquely upward, lower jaw prominent, upper jaw short, not reaching beyond eye-centre. Dorsal and pelvic fins absent. Anal fin very long, its origin well before midpoint of body. Dark bluish on back, flanks yellowish becoming silvery below.

Habitat Preference: Marine, commonly estuarine. Species recorded from Bhadbhut and Ambetha in lower stretches of the river.

Family: Engraulididae

- Body generally subcylindrical and quite strongly compressed
- Snout usually prominent and projecting beyond the tip of the lower jaw
- Scales cycloid, thin and rather deciduous; no lateral line
- Branchiostegal rays 7 to 19

Species: *Setipinna taty* (Valenciennes)

Synonyms: *Engraulis taty*.

Common Name: Scaly hairfin anchovy (English), Phansa (West Bengal).

Conservation Status (IUCN): Not Evaluated (NE).

Commercial importance: Considered as food fish.

Identifying Characters: Body rhombus and compact, belly keeled with 20 to 29 scutes. Mouth slightly oblique, pectoral filament long, reaching to base of 23 rd to last anal fin ray. Caudal fin forked its lower lobe longer. Scales present on dorsal and anal fins. Yellowish-brown or bluish shade in back, the flanks and belly silvery.

Habitat Preference: Sea and estuaries, enters into freshwaters also. Species recorded from Bhadbhut, Bharuch and Ambetha in lower stretches of the river.

Species: *Coilia dussumieri* (Valenciennes)



Synonyms: *Demicoilia margaratifera*.

Common Name: Goldspotted grenadier anchovy (English), Mandeli (Maharashtra), Ooarialli (Orissa).

Conservation Status (IUCN): Not Evaluated (NE).

Commercial importance: Common food fish in Orissa, Gujarat and Maharashtra.

Identifying Characters: Body elongate, narrowing to very slender tail, belly rounded, with five or six sharp scutes before pelvic fin base and seven to nine post- pelvic scutes. Pectoral fin with six long filaments. Scales small and deciduous, back light brown, flanks and belly silvery with rows of pearly or gold spots.

Habitat Preference: Coastal waters and estuaries. It is recorded from Bhadbhut, lower stretches of river.

Order: Cypriniformes

- Barbels present or absent
- Dorsal fin composed largely of soft branched rays
- Pelvic fins abdominal. Head scaleless; body covered with cycloid scales, rarely

wholly or partly naked; lateral line almost always present and complete

- Branchiostegal rays 3

Family: Cyprinidae

- Body compressed
- Mouth terminal to inferior, toothless
- Barbels present or absent, if present, one or two pairs
- Pharyngeal teeth well developed, in one to three rows, never more than eight teeth in any row
- Gill-openings wide; gill-membranes usually joined with isthmus
- Branchiostegal rays 3

Species: *Amblypharyngodon mola* (Hamilton-Buchanan)



Synonyms: *Cyprinus mola*, *Amblypharyngodon saranensis*, *Amblypharyngodon gadigarhi*.

Common Name: Mola carplet, Pale Carplet (English), Maurala, Mowa, Mowka (West Bengal), Dhawai (U.P & M.P.).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: Important food fish with high market value.

Identifying Characters: Abdomen more or less rounded. Upper lip absent. Barbels absent. Dorsal fin inserted behind pelvic fin base. Scales small, lateral line incomplete. A broad silvery lateral band on body.

Habitat Preference: Fresh water rivers, canals, beels, slow-moving stream, nullahs and paddy fields. The species recorded from upper and middle stretches of river Narmada in Mandla, Tilwaraghat and Kareli.

Species: *Aspidoparia morar* (Hamilton-Buchanan)



Synonyms: *Cyprinus morar*.

Common Name: Aspidopara (English), Morar, Morari (West Bengal), Chippuah (Bihar), Pirohia (U.P.).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: Food fish.

Identifying Characters: Mouth inferior, jaws short, lower jaw without any lip but with a sharp crescentic bony edge. Body elongate and subcylindrical. Barbels absent. Dorsal fin inserted well behind pelvic fin base. Dorsal fin with 7 to 8 branched and 2 to 3 unbranched rays and without any spine. Lateral line curved, running in lower half of caudal peduncle with 38 to 42 scales.

Habitat Preference: Fresh water rivers, streams, lakes in plains and mountainous regions. Species recorded from upper and lower middle stretches of the river in Bergi, Kareli, Mandla and Sisodra.

Species: *Barilius barila* (Hamilton-Buchanan)



Synonyms: *Cyprinus (Barilius) barila*, *Barilius bonarensis*.

Common Name: Barred baril (English), Gilland, Koksa, Chaedra (West Bengal), Persee (Uttar Pradesh).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: Trash fish and also used as a bait for other commercially important fishes.

Identifying Characters: Barbels two pairs; rostral pair very short, maxillary barbels extend upto anterior-third of orbit, often barbels are hidden underneath folds of skin. Dorsal fin inserted behind pelvic fin and devoid of osseous rays. Pectoral fin as long as head with 13 rays. Anal fin rays 13 to 14. Caudal fin forked and lower lobe slightly longer. Lateral line with 43 to 46 scales. 14 to 15 or sometimes less number of vertical bands extend from dorsal side to lateral line. Number of pre-dorsal scale 22.

Habitat Preference: Hill streams and shallow clear rivers along foot hills. Species recorded from open stretch of the river at Amarkantak and Mandla.

Species: *Barilius bendelisis* (Hamilton-Buchanan)



Synonyms: *Cyprinus bendelisis*, *Cyprinus (Barilius) cocsa*, *Cyprinus (Barilius) chedra*, *Barilius howesi*.

Common name: Hamilton's barila (English), Bahgra-bahri (Orissa), Khoksa, Joia (West Bengal), Jodhia, Jhorya, Jhor (Maharashtra).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: One of the important hill stream fish and considered as food fish.

Identifying Characters: Body shallow and mouth moderate. Barbels two pairs, rostral and maxillary, the rostral pair rudimentary or often absent. A thick layer of spiny tubercles on snout and lower jaw. Dorsal fin inserted in advance of anal fin and nearer to caudal base than to snout tip. Pectoral fin rays 15. 12 dark bands descending towards the lateral line which become indistinct and appears as spots in adults. Lateral line scale with two black spots at their base.

Habitat Preference: Streams, rivers, particular in hill stream. Also found in fresh water adjacent to rocky substrate. Species recorded from upper stretches of the river at Amarkantak and Mandla.

Species: *Catla catla* (Hamilton-Buchanan)



Synonyms: *Cyprinus catla*, *Catla buchanani*.

Common Name: Catla (English), Catla (West Bengal), Katla, Chepti (U.P.), Tambra (Gujarat).

Conservation Status (IUCN): Not Evaluated (NE).

Commercial importance: An important fast growing Indian major carp with high market priced.

Identifying Characters: Body deep, head enormously large. Mouth upturned and upper lip absent. Barbels absent. Dorsal fin with 17-20 fin rays (14 to 16 branched rays). Scales large, lateral line with 40 to 43 scales.

Habitat Preference: Rivers, lakes and culture ponds. The species recorded from the upper middle stretches of the river Narmada in Mandla, Kareli, Tilwaraghat and Bergi.

Species: *Chagunius chagunio* (Hamilton-Buchanan)



Synonyms: *Cyprinus chagunio*, *Barbus chagunio*, *Barbus spilopholus*, *Barbus (Chagunius) chagunio*.

Common Name: Chaguni (English), Jerruah (West Bengal), Utta, Galehri, Musaina (U.P.).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: Good sport and food fish.

Identifying Characters: Mouth sub-terminal, lips fleshy with tiny papillae. Two pairs of barbels (rostral & maxillary), longer than orbit. Dorsal spine strong and serrated, dorsal fin with 13 rays (8 branched rays). Scales diamond shaped, lateral line with 44 to 48 scales. Last two anal fin rays elongated in males. Silvery in colour with pinkish tinge, black at scale margin.

Habitat Preference: Usually prefer fast flowing large rivers with rocky bottom. Recorded from Mandla, upper stretch of river Narmada.

Species: *Chela laubuca* (Hamilton-Buchanan)



Synonyms: *Cyprinus (Chela) laubuca*, *Perilampus laubuca*, *Danio (Danio) menoni*.

Common Name: Indian glass-barb, Indian hatchet fish (English), Layubuka, Dankena, Bekichela (West Bengal), Dendula, Dennahrah (U.P.).

Conservation Status (IUCN): Not Evaluated (NE).

Commercial importance: One of the potential tropical aquarium fish.

Identifying Characters: Body deep and strongly compressed. Mouth oblique, its cleft not reaching to front edge of eye. Abdominal edge keeled from below pectoral fin to anal fin. Dorsal fin commences slightly behind the origin of anal. Wing like pectorals stout and elongated. Outer pelvic fin ray elongated and extending to middle or end of anal base. Lateral line complete, curved downwards. Lateral line with 34 to 37 scales. A well defined spot on opercles.

Habitat Preference: Inhabits the middle-depth area of streams, ponds and tanks. Occurs in shallow and relatively deep areas of streams, both in still and relatively fast-flowing waters. Species recorded from Tilwaraghat, upper middle stretch of the river.

Species: *Cirrhinus mrigala* (Hamilton-Buchanan)



Synonyms: *Cyprinus mrigala*, *Cirrhina mrigala*, *Cirrhinus chaudhryi*.

Common Name: Mrigal (English), Mrigal, Mrigala (West Bengal), Mrigal, Mirki (U.P.), Mrigal, Morahkee, Nagari (Gujarat).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: One of the important Indian major carp with excellent in eating.

Identifying Characters: Body streamlined. Lower lip indistinct. One pair of short rostral barbels. Dorsal fin with 15-17 rays (12 to 13 branched rays). Lateral line with 40 to 45 scales.

Habitat Preference: Inhabits fast flowing streams and rivers. A very active fish that thrives in ponds but spawns in swift rivers. Recorded from upper and lower middle stretches of the river in Kareli, Mandla and Sisodra.

Species: *Cirrhinus reba* (Hamilton-Buchanan)



Synonyms: *Cyprinus reba*, *Cirrhina reba*.

Common Name: Reba carp (English), Raig, Batta, Kharge-bata (West Bengal), Rewah,

Raicheng (U.P.), Reba (Gujarat).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: Important food fish.

Identifying Characters: Body elongate. Dorsal fin with 10-11 rays (8 branched rays). A thin cartilaginous layer covering lower jaw. Scales hexagonal. A short pair of rostral barbels. Lateral line with 34 to 38 scales.

Habitat Preference: Inhabits large streams and rivers. Recorded from upper and lower middle stretch of the river in Kareli, Tilwaraghat, Mandla, Sisodra and Jhanaur.

Species: *Crossocheilus latius latius* (Hamilton-Buchanan)



Synonyms: *Cyprinus latius*, *Cirrhina latia*.

Common Name: Gangetic latia (English), Kalabatta (West Bengal), Gauma, Petphorani (U.P.).

Conservation Status (IUCN): Not Evaluated (NE).

Commercial importance: Food fish with less importance.

Identifying Characters: Body fairly elongate. Dorsal profile more convex than ventral profile. barbels 2 pairs (maxillary and rostral). A pendulous lobe at corners of mouth. Origin of dorsal fin midway between snout-tip and posterior base of anal. Dorsal with 12 fin rays (8 branched). Caudal deeply forked. Lateral line continuous with 36 to 41 scales. Body with a faint longitudinal stripe along sides of the body.

Habitat Preference: Inhabits freshwater streams and rivers. Found over gravel and stony bottom of mountain streams. Species collected from Mandla, Tilwaraghat and Sisodra of the river stretch.

Species: *Cyprinus carpio* (Linnaeus)



Synonyms: *Cyprinus carpio intha*.

Common Name: Common carp (English).

Conservation Status (IUCN): Vulnerable (VU).

Commercial importance: Important food and sport fish.

Identifying Characters: Body robust, more or less compressed, abdomen rounded. Mouth small, terminal and protrusible; lips thick and fleshy. Barbels 2 pairs, one pair each of rostral and maxillary; maxillary pair longer than rostral. Dorsal fin very long with 3 spines and 18 to 20 rays, dorsal spine stout and serrated. Caudal fin deeply emarginated. Lateral line straight with 30 to 40 scales. It is an exotic carp.

Habitat Preference: Prefers bottom of the pond. Available in river also perhaps due to influx of rivers during flood. Species collected from Mandla site, upper middle stretch of the river.

Species: *Danio devario* (Hamilton-Buchanan)



Synonyms: *Cyprinus devario*.

Common name: Devario danio (English), Bonkuaso (Orissa), Debari, Bashpata, Anju (West Bengal).

Conservation Status (IUCN): Not Evaluated (NE).

Commercial importance: This beautiful species is a popular aquarium fish.

Identifying features: Body rhomboidal and compressed. Mouth small, obliquely directed upwards, maxilla not extending anterior margin of eye. Barbels absent. Dorsal origin in front of anal with 17 to 20 fin rays (15 to 17 branched). Caudal fin emarginate to lunate. Lateral line complete with 35 to 38 scales. Anterior part of body reticulated by longitudinal blue and vertical yellow bands. Three bluish lines extending backwards to caudal.

Habitat Preference: Inhabits rivers, canals, ponds, beels and inundated fields. Species recorded from Kareli and Tilwaraghat sites.

Species: *Hypophthalmichthys molitrix* (Valenciennes)



Synonyms: *Leuciscus molitrix*.

Common Name: Silver carp (English).

Conservation Status (IUCN): Near Threatened.

Commercial importance: Food fish.

Identifying Characters: Body stout, abdomen compressed, with a sharp keel from throat to vent. Head rather small. Mouth terminal, lower jaw slightly longer than upper. Gillrakers continuous, forming a broad, crescentic, horny membrane, its basal portion perforated. Dorsal fin short with 10 fin rays (97 branched) inserted slightly behind pelvic fins. Scales small; lateral line with 110 to 115 scales. Silvery white with blood red spot on body.

Habitat Preference: Though exotic species, introduced in Indian waters for culture purposes. Occasionally occurs in rivers perhaps escape from the culture ponds. This exotic species collected from Mandla sampling site, upper middle stretch of the river.

Species: *Hypophthalmichthys nobilis* (Richardson)



Synonyms: *Leuciscus nobillis*, *Aristichthys nobilis*.

Common Name: Bighead carp (English).

Conservation Status (IUCN): Data Deficient (DD).

Commercial importance: Food fish.

Identifying Characters: Body strong and compressed. Dorsal fin with 10 rays (7 branched), short and inserted behind origin of pelvic fins. Mouth rather leaning and terminal. Gillrakers separated, slender and long, set very closely, with many membranous septa. Scales small, lateral line with about 115 scales. Greyish shade present on the dorsal and paler in below.

Habitat Preference: Introduced into Indian waters and being cultivated in the ponds. Also occur in large rivers and lakes. This fish species recorded from upper stretch of the river Narmada in Mandla site.

Species: *Labeo bata* (Hamilton-Buchanan)



Synonyms: *Cyprinus bata*.

Common Name: Bata labeo (English), Bhangambata, Bata, Bhanga (West Bengal), Bhang, Bata (U.P.), Rajadi, Tambti (Maharashtra).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: Important food fish.

Identifying Characters: Mouth inferior, lips thin and continuous, a small tubercle inside lower jaw above mandibular symphysis. Dorsal fin with 11 to 14 rays (branched rays 9 to 10). One pair of minute maxillary barbels, not easily seen. Lateral line scales 37 to 40. Young often with few irregular black spots on anterior scales of lateral line. Golden yellow above and on dorsal half of flanks.

Habitat Preference: Freshwater rivers and lakes. Also cultivated in ponds. Species obtained from upper and lower middle stretch of the river Narmada in Mandla, Kareli, Tilwaraghat and Sisodra.

Species: *Labeo boga* (Hamilton-Buchanan)



Synonyms: *Cyprinus boga*, *Cyprinus falcatus*.

Common Name: Boga labeo (English), Bogabata, Bangan (West Bengal), Bhagan, Bhagna (U.P.).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: Minor with less important food fish.

Identifying Characters: Mouth narrow, lips thick, a thin horny layer of cartilage to inner surface of lower lip. Dorsal fin with 9 to 10 branched rays (total rays 11 to 13). One pair of minute maxillary barbels. Lateral line scales 37 to 39.

Habitat Preference: Fresh water rivers. Specimen recorded from upper and lower-middle stretch of the river Narmada in Mandla, Tilwaraghat, Kareli and Sisodra sites.

Species: *Labeo calbasu* (Hamilton-Buchanan)



Synonyms: *Cyprinus calbasu*.

Common Name: Kalbasu, Black rohu (West Bengal), Kalbasu, Kalbose, Kundu (West Bengal), Karnaunehar, Kalabenise (U.P.), Kanas (Maharashtra).

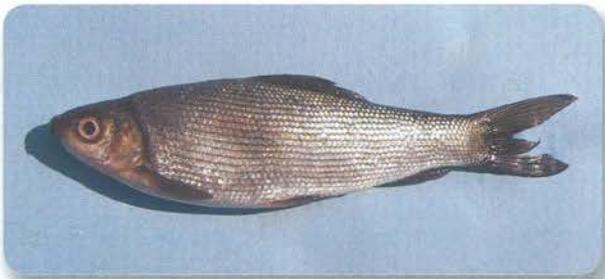
Conservation Status (IUCN): Least Concern (LC).

Commercial importance: One of the important food fish.

Identifying Characters: Body strong and deep, mouth inferior, lips thick and fringed, lower jaw more thickened. Two pairs of barbels (rostral and maxillary). Dorsal fin (16 to 20 rays) with a long base, branched dorsal rays 13 to 16. Lateral line scales 40 to 44. Easily distinguished from the very dark colour of its body.

Habitat Preference: Inhabits rivers and ponds in slow-moving waters of rivers. Occurs in rivers, lakes and culture ponds also. Species recorded from upper and lower-middle stretch of the river Narmada in Mandla, Tilwaraghat, Kareli and Sisodra sites.

Species: *Labeo gonius* (Hamilton-Buchanan)



Synonyms: *Cyprinus gonius*.

Common Name: Kuria labeo (English), Bahtoor, Kurhi, Kuria (West Bengal), Kurcha (Gujarat).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: Considered as food fish.

Identifying Characters: Mouth sub-inferior, lips thick and fringed, horny covering of both the jaws. Two very short pairs of barbels (rostral and maxillary). Branched dorsal fin rays 12 to 18 (total dorsal fin rays 16 to 19). Scales small, lateral line scales 71 to 84. Greenish black shade on back.

Habitat Preference: Inhabits rivers. Cultured in ponds along with other carp species. The fish species recorded from upper and lower-middle stretch of the river Narmada in Mandla, Tilwaraghat, Kareli and Sisodra sites.

Species: *Labeo rohita* (Hamilton-Buchanan)



Synonyms: *Cyprinus rohita*, *Labeo horai*.

Common Name: Rohu (English), Rohu, Riu, Ruee, Rohu (West Bengal), Bhubhari (U.P.), Tambada-massa (Maharashtra).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: Prized Indian major carp and excellent food fish.

Identifying Characters: Snout obtuse, mouth small and inferior. Lips thick and fringed with a distinct inner fold to each lip. Branched dorsal rays 12 to 14. (total dorsal fin rays 15 to 18). Lateral line scales 40 to 44. One pair of small, thin maxillary barbels concealed in lateral grooves.

Habitat Preference: Rivers and large lakes. Also cultivated in ponds. The species recorded from upper and lower-middle stretch of the river Narmada in Mandla, Tilwaraghat, Kareli, Bergi and Sisodra sites.

Species: *Osteobrama cotio cotio* (Hamilton-Buchanan)



Synonyms: *Cyprinus cotio*, *Rohtee cotio*.

Common Name: Cotio (English), Goonta, Koti, Maura (West Bengal), Goordah, Gurda, Muchnee (U.P.), Guddi, Bhongi (Maharashtra).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: A trash fish.

Identifying Characters: Body deep and compressed. Profile over nape concave. Snout bluntly rounded eyes large. Abdominal edge keeled only between pelvic and anal fins. Rounded abdominal edge in front of pelvic fins. Mouth small and directed upwards. Upper jaw slightly longer. Barbels absent. Dorsal fin spine weak and serrated. Anal fin long with 29 to 36 rays. Scales small, lateral line with 55 to 70 scales. Usually silvery in colour.

Habitat Preference: Inhabits freshwater rivers, ponds, ditches and lakes. Adults occur in rivers. The species recorded from upper and lower-middle stretches of the river Narmada in Mandla, Tilwaraghat, Kareli, Bergi and Sisodra sites.

Species: *Puntius conchonius* (Hamilton-Buchanan)



Synonyms: *Cyprinus conchoniuis*, *Barbus conchoniuis*.

Common Name: Rosy barb, Red barb (English), Kunchon-pungti (West Bengal), Kharauli-pothi, Pothi (U.P.).

Conservation Status (IUCN): Not Evaluated (NE).

Commercial importance: One of the potential hardy aquarium fish and can be put in aquarium with other small fishes.

Identifying Characters: Body deep, barbels absent. Dorsal fin spine osseous, moderately strong and serrated. Lateral line incomplete. A large round black spot over posterior portion of anal fin, dorsal fin with its upper half black.

Habitat Preference: Generally inhabits lakes and fast flowing streams. The fish species recorded from upper and lower-middle stretch of the river Narmada in Mandla, , Kareli, Jhanaur and Sisodra sites.

Species: *Puntius sarana* (Hamilton-Buchanan)



Synonyms: *Cyprinus sarana*, *Barbus sarana*, *Barbus chrysopoma*, *Puntius saberi*.

Common Name: Olive barb (English), Sarana, Saral-punti, Swarna-punti, Kurti (West Bengal), Giddi-kaoli, Durhie, Potah (U.P.).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: Good food fish in some parts of the country. Has limited demand in the aquarium trade.

Identifying Characters: Lips thin, no horny covering on inner side of lips. 2 pairs of barbels (maxillary & rostral). Last un-branched ray of dorsal fin osseous, strong and finely serrated posteriorly. Lateral line completes with 30 to 33 scales. A blotch on lateral line before base of caudal fin.

Habitat Preference: Occurs in rivers, streams, lakes and backwaters. Tolerant to salinity.

The fish species recorded from upper, lower-middle and lower stretch of the river Narmada in Mandla, Tilwaraghat, Kareli, Bergi, Sisodra and Jhanaur sites.

Species: *Puntius sophore* (Hamilton-Buchanan)



Synonyms: *Cyprinus sophore*, *Barbus stigma*, *Barbus sophore*, *Barbus chrysopterus*, *Barbus annandalei*, *Barbus carletoni*, *Puntius carletoni*.

Common Name: Spotfin swamp barb (English), Katcha-karawa, Pottiah, Pothe (U.P.).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: Usually reared in domestic aquarium.

Identifying Characters: Barbels absent. Last unbranched ray of dorsal fin osseous and smooth. Lateral line completes with 22 to 27 scales. A deep black round blotch at base of caudal fin, a similar black blotch on central part of dorsal fin; often with scarlet lateral band.

Habitat Preference: Inhabits rivers and lakes in plains and submontane regions. Prefers substrate consisting of sand, mud, gravel, pebble, cobble, and boulders. This species recorded from upper and lower-middle stretch of the river Narmada in Mandla, Tilwaraghat, Bergi and Sisodra sites.

Species: *Puntius ticto* (Hamilton-Buchanan)



Synonyms: *Cyprinus ticto*, *Puntius punctatus*, *Barbus ticto*, *Barbus punctatus*,

Barbus stoliczkanus.

Common Name: Ticto barb, Firefin barb, Two-spot barb (English), Kotree, Kaoli (Bihar), Pothia (U.P.).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: One of the potential aquarium fish.

Identifying Characters: Body elongated. Mouth terminal and small. Barbels absent. Dorsal fin inserted slightly posterior to pelvic fin origin. Last unbranched dorsal fin ray osseous, fairly strong and serrated at its posterior edge. Lateral line usually complete, often ceases after 6 to 8 scales; 23 to 25 scales in lateral series. Body often with two lateral spots, the 1st one extending over 3rd and 4th scales and 2nd one over 18th and 19th scales of lateral line. Dorsal fin in males with red border.

Habitat Preference: Found in still, shallow, marginal waters of tanks and rivers, mostly with muddy bottoms. Rivers and lakes in montane and submontane regions. This fish species recorded from upper and lower-middle stretch of the river Narmada in Mandla, Tilwaraghat, Kareli, Bergi, Sisodra and Jhanaur sites.

Species: *Parluciosoma daniconius* (Hamilton-Buchanan)



Synonyms: *Cyprinus daniconius*, *Rasbora daniconius*.

Common Name: Blackline rasbora (English), Danikoni, Angjani, Dhera (West Bengal), Jilo (Orissa), Jonir Darai (Gujarat).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: It is a potential aquarium fish.

Identifying Characters: Body elongated, compressed and small. Barbel absent. Dorsal fin inserted behind origin of pelvic fin. Dorsal fin with 9 rays (7 branched). Pectoral fin smaller than head. Lateral line nearly complete with 31 to 34 scales. A black lateral stripe along centre of body from eye to base of caudal.

Habitat Preference: Inhabits pools, ditches, streams and river. This fish species recorded from upper stretch of the river Narmada in Mandla, Amarkantak and Tilwaraghat sites.

Species: *Salmophasia bacaila* (Hamilton-Buchanan)



Synonyms: *Cyprinus bacaila*, *Chela bacaila*.

Common Name: Large razorbelly minnow (English), Jellahri Gangchela, Chela (West Bengal), Chilwa, Chelhava (U.P.).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: One of the important minor food fish.

Identifying Characters: Body elongated and strongly compressed, abdominal keel not hardened. Dorsal fin inserted well behind pelvic fins and in advance of anal fin. Scales very small, lateral line decurved with 86 to 110 scales. Anal fin with 10 to 13 branched rays.

Habitat Preference: Usually found in slow running streams, rivers, ponds, beels and inundated fields. The species recorded from upper and middle-lower stretch of the river Narmada in Mandla, Kareli, Bergi, Tilwaraghat, Sisodra and Jhanaur sites.

Species: *Securicula gora* (Hamilton-Buchanan)



Synonyms: *Cyprinus gora*, *Leuciscus cultellus*, *Chela gora*, *Oxygaster gora*.

Common Name: Gora chela (English), Ghora-chela (West Bengal), Cholula,

Chelua (U.P.).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: Trash fish.

Identifying Characters: Body more or less elongated and compressed. Cleft of mouth reaching to anterior edge of eye. Edge of abdomen with a sharp keel extends from below operculum to anal fin. Short dorsal fin inserted slightly anterior to origin of anal fin. Scales small, lateral line complete and curved downwards with 120-160 scales.

Habitat Preference: Inhabits tanks, beels, canals and rivers. In this exploration the fish species recorded from upper and middle-lower stretch of the river Narmada in Kareli, Bergi, Tilwaraghat, Sisodra and Jhanaur sites.

Species: *Tor tor* (Hamilton-Buchanan)



Synonyms: *Cyprinus tor*, *Barbus tor*, *Barbus (Tor) tor*.

Common Name: Tor mahseer (English), Mahasol (West Bengal).

Conservation Status (IUCN): Near Threatened.

Commercial importance: Important food and a prized game fish.

Identifying Characters: Mouth small, lips thick, fleshy with the labial fold continuous; lower lip with an uninterrupted posterior groove forming a median lobe. Barbels 2 pairs (maxillary barbels equal to eye-diameter, rostral pair shorter). A scaly sheath at base of dorsal fin, dorsal spine bony, smooth. Scales large, lateral line with 22 to 27 scales.

Habitat Preference: Rivers and lakes, also in rapid streams with rocky bottom. The species recorded from upper and middle-lower stretch of the river Narmada in Mandla, Tilwaraghat sites.

Family: Balitoridae

- Body depressed, three to more pairs of barbels present
- Paired fins inserted horizontally

- Pectoral fin with at least two undivided rays

Species: *Nemacheilus botia* (Hamilton-Buchanan)



Synonyms: *Cobitis botia*, *Botia nebulosa*, *Nemachilus botius*, *Nemachilus mackenziei*, *Noemacheilus botia*.

Common Name: Balichata.

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: Potential aquarium fish.

Identifying Characters: Body slender, almost cylindrical. Mouth semicircular; lips thick, fleshy and papillated, upper lip uninterrupted, lower lip interrupted in middle. Barbels well developed. Dorsal fin inserted nearer to snout-tip than caudal base, dorsal with 12-14 finrays (9 to 11 branched). Caudal fin slightly emarginated. Reduced number of scales on breast. 12 to 16 blackish vertical cross bands descending below level of lateral line from dorsal side of the body, the cross bands broken up irregularly in patches. Caudal fin with 5 to 7 'v' shaped dark bands and a ocellus on upper caudal fin base.

Habitat Preference: Hilly streams and submontane zones with rocky bottom. This fish species recorded from upper stretch of the river Narmada in Mandla and Amarkantak sites.

Family: Cobitidae

- Head and body compressed, not flattened below; worm-like to fusiform
- Mouth subterminal to inferior; lips thick, fleshy and papillated; no teeth on jaws and palate, but with a single row of pharyngeal teeth
- Three pairs of barbels usually present
- Airbladder enclosed in an osseous capsule, its posterior part small or vestigial

Species: *Lepidocephalus guntea* (Hamilton-Buchanan)



Synonyms: *Cobitis guntea*, *Cobitis balgara*, *Lepidocephalichthys guntea*, *Lepidocephalus octocirrhus*, *Lepidocephalus guntea birmanicus*, *Lepidocephalus dibruensis*.

Common Name: Guntea loach (English).

Conservation Status (IUCN): Not Evaluated (NE).

Commercial importance: One of the potential aquarium fish.

Identifying Characters: Mouth inferior. Barbels 3 pairs. Short dorsal fin inserted posterior to origin of pelvic fins, and nearer to caudal base than to snout tip. Dorsal fin with 8 to 10 rays (6 to 7 branched). Caudal fin truncated. Scales small, sides and ventral side of head covered with small scales. In juvenile stage, a delicate yellowish stripe extends from snout to caudal base, and there are 10 to 12 black blotches along this stripe grow in size and fuse with one another to form a continuous dark band with age.

Habitat Preference: Inhabits flowing or even clear standing waters. This fish species recorded from upper and middle - lower stretch of the river Narmada in Mandla, Tilwaraghat, Kareli and Sisodra sites.

Order: **Siluriformes**

- Body elongate and compressed, either naked or covered with bony plates
- Eyes usually small
- Maxilla usually rudimentary and serve as a support for a barbel
- Spines often present at the front of the dorsal and pectoral fins
- Branchiostegal rays 4 to 17; no pseudobranchiae

Family: **Bagridae**

- Body naked, rather elongate and compressed posteriorly
- Gill-openings wide; gill-membranes free from each other and also from the isthmus
- Mouth usually somewhat subterminal; teeth on premaxillaries, mandible and

prevomer

- Barbels generally four (three in Rita) well-developed pairs
- Pectoral fin with a strong serrated spine
- Vertebrae 34 to 57

Species: *Mystus bleekeri* (Day)



Synonyms: *Bagrus keletius*, *Macrones bleekeri*, *Mystus bleekeri* var. *burmanicus*.

Common Name: Tengra, Golsha-tengra (West Bengal), Tengara (U.P.), Singhala (Maharashtra).

Conservation Status(IUCN): Least Concern (LC).

Commercial importance: A food fish.

Identifying Characters: Maxillary barbels extend posteriorly to anal fin. Dorsal spine smooth, rarely finely serrated. Body with two light longitudinal colour bands one above and below the lateral line.

Habitat Preference: Lakes, tanks and rivers. This fish species recorded from all the sampling sites except from Bhabhuth and Ambetha stretch of the river.

Species: *Mystus cavasius* (Hamilton-Buchanan)



Synonyms: *Pimelodus cavasius*, *Macrones cavasius*, *Mystus mukherjii*.

Common Name: Gangetic *Mystus* (English), Tengra, Kabasi-tengra (West Bengal), Singhara, Kavasi, Tenguah (U.P.), Khirkirya, Katirna (Maharashtra).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: Important food fish.

Identifying Characters: Maxillary barbels very long extend posteriorly to beyond caudal fin base. Upper lobe of caudal fin much longer than lower lobe. A dark spot on base of dorsal spine.

Habitat Preference: Inhabits freshwater and tidal rivers and lakes; also beels, ponds, ditches and inundated fields. Recorded from upper, lower middle and lower stretch of the river Narmada in Mandla, Kareli, Tilwaraghat, Bergi, Sisodra and Jhanaur sites.

Species: *Mystus gulio* (Hamilton-Buchanan)



Synonyms: *Pimelodus gulio*, *Macrones gulio*, *Mystus (Mystus) gulio*.

Common Name: Long-whiskered cat fish (English), Nuna-Tengra (West Bengal), Singati (Maharashtra).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: Important food fish.

Identifying Characters: Upper surface of head rough and granulated. Dorsal spine strong, serrated on its posterior edge. Adipose dorsal fin small. Upper lobe of caudal fin slightly longer than lower. Body plain, no longitudinal bands on flanks of body.

Habitat Preference: Inhabits in partly marine but enters in estuaries, tidal rivers and lakes. Recorded from lower stretch of the river Narmada in Bhadbhut and Ambetha sites.

Species: *Mystus tengara* (Hamilton-Buchanan)



Synonyms: *Pimelodus tengara*, *Macrones tengara*.

Common Name: Tengara Mystus (English), Tengara (West Bengal, Bihar).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: Important food fish.

Identifying Characters: Body elongated and slightly compressed. Dorsal spine serrated on its posterior edge, also slightly at its tip on anterior edge. Long adipose fin, body with five brown to greenish-black longitudinal bands on flanks.

Habitat Preference: Lentic and Lotic waters of large rivers, streams and lakes. Recorded from upper, lower- middle and lower stretch of the river Narmada in Mandla, Kareli, Tilwaraghat, Bergi, Sisodra and Jhanaur sites.

Species: *Mystus vittatus* (Bloch)



Synonyms: *Silurus vittatus*, *Macrones vittatus*, *Mystus (Mystus) vittatus vittatus*.

Common Name: Striped dwarf catfish (English), Tengra (West Bengal), Kuggur, Tengra, Palwa (Bihar).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: Food fish as well as aquarium fish.

Identifying Characters: Adipose dorsal fin small or short with considerable inter-space

between dorsal fin and adipose fin. Body with three or four longitudinal colour bands above and below the lateral line. A narrow dusky shoulder spot often present.

Habitat Preference: Inhabits standing and flowing waters; occurring within the tidal influence also. Usually found among marginal vegetation in lakes and swamps with a mud substrate. The species recorded from upper and lower stretch of the river Narmada in Mandla, Kareli, Tilwaraghat, Bergi and Bhadbhut sites.

Species: *Rita pavementatus* (Valenciennes)



Synonyms: *Arius pavementatus*, *Phractocephalus gogra*, *Rita pavimenta*, *Rita gogra*.

Common Name: Gogra rita (English), Pillah-gokundu, Chagra (Madhya Pradesh).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: Food Fish.

Identifying Characters: Body elongate. occipital process extends to predorsal plate. Mouth oblique, barbels three pairs; maxillary barbels extend posteriorly to operculum, mandibular barbels to base of pectoral fin, others shorter. Dorsal spine strong and posteriorly serrated, 6 branched rays. Lateral line straight. Slightly golden to bright yellow in colour.

Habitat Preference: Large rivers and lakes. The species recorded from upper-middle stretch of the river in Tilwaraghat and Bergi.

Species: *Rita rita* (Hamilton-Buchanan)



Synonyms: *Pimelodus rita*, *Rita buchanani*, *Rita sacerdotum*, *Rita ritoides*.

Common Name: Rita (English), Rita, Reta (West Bengal).

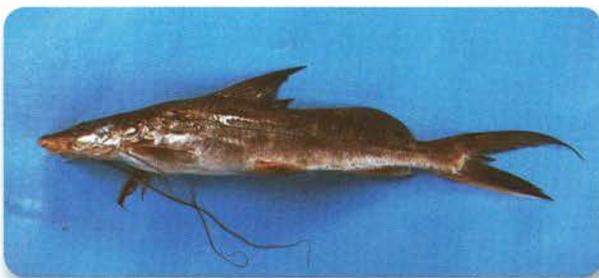
Conservation Status (IUCN): Least Concern (LC).

Commercial importance: One of the common food fish.

Identifying Characters: Head depressed with osseous plates and flattened ventral side. 3 pairs of barbels (maxillary, nasal and mandibular). Maxillary barbels extend to the end of head. Dorsal spine strong, serrated posteriorly in upper part only.

Habitat Preference: Freshwaters, also tidal waters. The species recorded from upper-middle and lower stretch of the river in Tilwaraghat, Bergi, Jhanaur and Bharuch.

Species: *Sperata aor* (Hamilton-Buchanan)



Synonyms: *Pimelodus aor*, *Macrones aor*, *Mystus (Sperata) aor*.

Common Name: Long-whiskered catfish (English), Aar, Guji, Aar-tengara (West Bengal), Kanti, Gaga Tengra (Bihar), Daryai-tengara (U.P.), Singala (Maharashtra).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: Is an important food and game fish.

Identifying Characters: Anterior margin of snout rounded. 4 pairs of barbels (1 pair

maxillary, 1 pair nasal and 2 pairs mandibular). Maxillary barbels extend to the end of anal or caudal base or beyond. Pectoral spine denticulate posteriorly, pectoral fin rays 10 or 11. Caudal fin deeply forked with pointed lobes, upper longer; caudal fin with 19 rays.

Habitat Preference: Inhabits freshwater rivers, ponds, lake, channels and reservoirs. The species recorded from upper-middle and lower stretch of the river in Mandla, Tilwaraghat, Bergi, Sisodra, Jhanaur sites.

Species: *Sperata seenghala* (Sykes)

Synonyms: *Platystoma seenghala*, *Macrones seenghala*, *Mystus (Sperata) seenghala*.



Common Name: Giant river- catfish, Tengara , Seenghari (English), Arr-tengara, Guji (West Bengal) Seenghala, Tengra, Tengara (U.P.) Singhala, Singhta (Maharashtra).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: Important food and game fish, popular to anglers also.

Identifying Characters: Outer margin of snout truncate. Barbels four pairs, maxillary pair extend to the base of pelvics or a little beyond. Pectoral spine stronger than dorsal and denticulated posteriorly, pectoral fin rays 8 or 9. Caudal fin rays 19 to 21.

Habitat Preference: Rivers, canals, beels, ditches, inundated fields, etc. The species recorded from upper-middle and lower stretch of the river in Mandla, Kareli, Bergi, Sisodra and Jhanaur sites.

Family: Siluridae

- Body elongate and compressed
- Head depressed
- Nostrils fairly close to each other; anterior nostrils tubular, posterior pair valved
- Gill-openings very wide; branchiostegal membranes more or less broadly overlapping, with 8 to 21 branchiostegal rays

- Anal fin very long (with up to 93 rays), ends shortly before anal fin
- Skin smooth; abdominal cavity restricted; vertebrae 52 to 74

Species: *Ompok bimaculatus* (Bloch)

Synonyms: *Silurus bimaculatus*, *Callichrous bimaculatus*, *Callichrous macrophthalmus*,



Callichrous gangeticus, *Callichrous sindensis*, *Ompok canio*, *Ompok sindensis*.

Common Name: Indian butter-catfish (English), Puffta, Papta, Gugli, Jalkapoor (U.P.), Gungwari (Gujarat), Goongwaree, Moone (Maharashtra).

Conservation Status (IUCN): Near Threatened

Commercial importance: Delicious food fish and an aquarium fish.

Identifying Characters: Gape of mouth not extending beyond eye. Maxillary barbels long extend slightly beyond anal fin base. Dorsal fin short with 4 rays, spine absent. Pelvic fin (7 to 9 rays) not reaching anal fin origin. Anal fin rays 60 to 75. One spot behind operculum.

Habitat Preference: Inhabits streams and rivers of all sizes with variable currents. Found in quiet, shallow (0.5-1.5 m), often muddy water, in sandy streams, rivers and tanks. The species recorded from upper-middle and lower stretch of the river in Kareli, Bergi, and Sisodra sites.

Species: *Wallago attu* (Schneider)

Synonyms: *Silurus attu*, *Wallagonia attu*, *Wallagu attu valeyia*.

Common Name: Boal (English), Koyali, Boal, Wallah, Valai, Paran (U.P.), Padin (Gujarat), Shivada, Pari, Purram, Pahree, Pattan (Maharashtra).

Conservation Status (IUCN): Near Threatened.

Commercial importance: Potential game fish and can be easily taken on a hook. Palatable food fish especially in North India.

Identifying Characters: Gape of mouth wide and very long reaching beyond eye posteriorly. Dorsal fin short with 5 rays and devoid of spine. Barbels two pairs, maxillary barbels extending beyond origin of anal fin. Upper lobe of caudal fin longer.

Habitat Preference: Found in large rivers, lakes and tanks. Thrives in heels with grassy margin mostly hides under holes in river banks and canals. Associated with deep, still or slow-flowing water with a mud or silt substrate. Sluggish and stays on muddy or silty bottom in search of food. The species recorded from upper-middle and lower stretch of the river in Kareli, Tilwaraghat, and Sisodra sites.

Family: Schilbeidae

- Body elongate and compressed
- Head tapering, conical to slightly compressed
- Eyes large, lateral or ventrolaterally directed
- Barbels two to four pairs, usually elongate (vestigial or absent in *Silonia*); nasal barbels generally present (except in *Silonia*)
- Gill-openings very wide; gill-membranes free from isthmus
- Anal fin very long, not confluent with caudal fin

Species: *Clupisoma garua* (Hamilton-Buchanan)



Synonyms: *Silurus garua*, *Pseudeutropius garua*.

Common Name: Garua Bachcha (English), Garua, Ghero, Kocha (West Bengal), Buchua (U.P.).

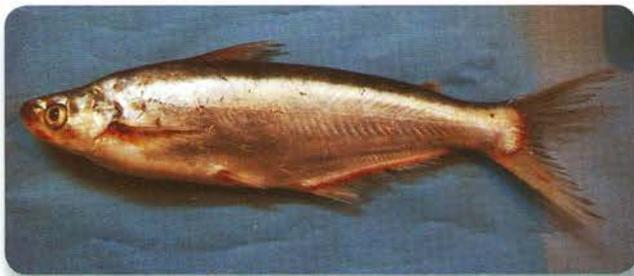
Conservation Status (IUCN): Least Concern (LC).

Commercial importance: Important food and game fish.

Identifying Characters: Abdominal edge keeled between pelvic fins and vent. Barbels 4 pairs, maxillary barbels extend to base of pelvic fins in adults. Adipose dorsal fin absent. Anal fin with 29 to 36 branched rays.

Habitat Preference: Large fresh water and tidal rivers. The species recorded from upper-middle and lower stretch of the river in Kareli, Tilwaraghat, Sisodra, Jhanaur and Bharuch sites.

Species: *Eutropiichthys murius* (Hamilton-Buchanan)



Synonyms: *Pimelodus murius*, *Pseudeutropius murius*, *Pseudeutropius murius batarensis*.

Common Name: Murius vacha (English), Motusi, Muribache (West Bengal), Golmuhi, Butchua (Bihar).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: Relished food fish.

Identifying Characters: Cleft of mouth extends to front border of orbit. Maxillary barbels extend beyond base of pectoral fin. Nasal barbels extend to hind border of orbit. Branchiostegal rays 5. Dusky colour on tips of pectoral and caudal fins.

Habitat Preference: Inhabit rivers, streams and canals. The species recorded from upper-middle and lower stretch of the river in Tilwaraghat, Sisodra, Jhanaur and Bharuch sites.

Species: *Eutropiichthys vacha* (Hamilton-Buchanan)



Synonyms: *Batchwa vacha*, *Eutropiichthys burmannicus*.

Common Name: Murius vacha (English), Vacha, Bacha (West Bengal), Bachwa (Bihar & M.P.).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: Relished food fish.

Identifying Characters: Mouth wide, cleft of mouth extends to posterior border of orbit. Barbels 4 pairs, nasal, maxillary and 2 pairs of mandibulars. Maxillary barbels reaching end of pre-opercle or even as long as head. Nasal barbels extend to posterior margin of head. Branchiostegal rays 11.

Habitat Preference: Inhabits fresh water rivers and tidal waters. The species recorded from upper-middle and lower stretch of the river in Mandla, Sisodra, Jhanaur and Bharuch sites.

Family: Clariidae

- Head covered with heavily ossified plates
- Dorsal and anal fin long, dorsal without spine
- Nasal barbel present
- Adipose dorsal fin absent

Species: *Clarias batrachus* (Linnaeus)



Synonyms: *Silurus batrachus*, *Clarias magur*, *Clarias jagur*, *Clarias assamensis*.

Common Name: Magur (English), Magur (West Bengal), Wagur, Manguri, Mangur (Bihar, M.P.).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: Highly priced food fish.

Identifying Characters: 4 pairs of barbels, maxillary pair large and extend beyond base of pectoral fin. Dorsal fin long with 70 to 77 rays. Anal fin with 45 to 58 rays. Pectoral spine strong and serrated on both sides.

Habitat Preference: Found in lowland streams, swamps, ponds, ditches, paddy field, and pools left in low spots after rivers have been in flood. Usually confined to stagnant, muddy water. Found in medium to large-sized rivers, flooded fields and stagnant water bodies including sluggish flowing canals. The species recorded from upper-middle stretch of the river in Kareli, Tilwaraghat, Bergi sites.

Family: Heteropneustidae

- Body elongate and compressed
- Mouth small, terminal and transverse; four well-developed pairs (nasal, maxillary and two mandibular) pairs of barbels
- Nostrils widely separated. Gill-openings wide; gill-membranes separated by a deep notch, free from isthmus
- Dorsal fin short-based, devoid of a spine; adipose fin absent or represented by a low ridge
- Anal fin extremely long (60 to 79 rays), just reaching to or confluent with caudal fin
- Pectoral fin with a strong osseous spine; pelvic fins well-developed, with 6 rays

Species: *Heteropneustes fossilis* (Bloch)

Synonyms: *Silurus fossilis*, *Saccobranchus fossilis*.

Common Name: Stringing catfish (English), Singhi (West Bengal), Bitchu, Talia, Singee (U.P.).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: Highly valued food fish.

Identifying Characters: 4 pairs of barbels, maxillary pair large and extend beyond base of pectoral fin. Dorsal fin long with 70 to 77 rays. Anal fin with 45 to 58 rays. Pectoral spine strong and serrated on both sides.

Habitat Preference: Found mainly in ponds, ditches, swamps and marshes, but sometimes occurs in muddy rivers. Thrives in ditches, swamps, beels, marshes, muddy waters, derelict pond with less oxygen contents. In this exploration this fish species recorded from upper-middle stretch of the river in Mandla, Kareli and Tilwaraghat sites.

Family: Ariidae

- Head covered with bony shield
- Nostril close together
- 1 to 3 pairs of barbels, nasal barbels absent. (One pair of maxillary and 2 pairs of mandibular)
- A short adipose dorsal fin present

Species: *Arius gadora* (Hamilton-Buchanan)



Synonyms: *Pimelodus gadora*, *Tachysurus gadora*.

Common Name: Gadora catfish (English).

Conservation Status (IUCN): Near Threatened.

Commercial importance: This catfish has got minor fishery value.

Identifying Characters: Body elongated, head depressed. Occipital process keeled slightly and reaching the base of the dorsal fin. Mouth sub-terminal, jaw teeth villiform. Dorsal fin spine pungent serrated posteriorly and also anteriorly in its upper half. Pectoral fin low, pectoral spine externally serrated and internally denticulated. Anal fin with 17 to 19 rays.

Habitat Preference: Estuaries and tidal rivers. Ascends rivers beyond tidal reach. The species recorded from lower stretch of the river in Bharuch, Bhadbhut and Ambetha sites.

Species: *Osteogeneiosus militaris* (Linnaeus)



Synonyms: *Silurus militaris*, *Osteogeneiosus sthenocephalus*.

Common Name: Soldier catfish (English).

Conservation Status (IUCN): Not Evaluated (NE).

Commercial importance: Less commercial importance.

Identifying Characters: Dorsal (7 branched rays) and pectoral fins with strong spines and serrated. Body elongate. Head depressed. Mouth moderate; a pair of very stiff and osseous maxillary barbels, fairly longer than head. Head and back of body intense dark blue with silvery reflections

Habitat Preference: Sea, estuaries and tidal rivers. The species recorded from lower stretches of river in Bhadbhut and Ambetha sites.

Oder: Aulopiformes

- Pelvic fins with 9 rays
- No spines on the fins
- Adipose dorsal fin present
- Mouth large, teeth on jaws well developed

Family: Harpadontidae

- Body elongate and translucent
- Large mouth
- Dorsal and anal fins with 12 to 15 rays
- Head and body naked except for scales on lateral line
- Pelvic fin extremely long

Species: *Harpadon nehereus* (Hamilton-Buchanan)



Synonyms: *Osmerus neherus*.

Common Name: Bombay duck (English), Bumaloh, Lutia, Nehere (West Bengal).

Conservation Status (IUCN): Not Evaluated.

Commercial importance: Food fish of less importance.

Identifying Characters: Body elongate and compressed. Eyes very small, covered by adipose membrane. Mouth very wide, armed with slender, recurved and depressible teeth. Pectoral fins long; pelvic fins very long. Uniform light grey, speckled with black; translucent when alive. Fins dark.

Habitat Preference: Coastal waters and tidal rivers. The species recorded from lower stretch of the river in Bhadbhut and Ambetha sites.

Order: Cyprinodontiformes

- Opercular and preopercular margin without spines
- Structure of upper jaw unique, the rostral cartilage separate from the premaxillae
- No fin spines
- Single dorsal fin
- Ctenoid scales rare
- Branchiostegal rays 4 to 15

Family: Belonidae

- Body elongate, subcylindrical or laterally compressed
- Nasal organ a pit with protruding tentacle
- Pectoral fins short, inserted high on sides; pelvic fins abdominal, with six soft rays
- Scales small, cycloid and easily detachable

Species: *Xenentodon cancila* (Hamilton-Buchanan)



Synonyms: *Esox cancila*, *Esox (Belone) hindostonicus*, *Belone cancila*.

Common Name: Spottail needlefish (English), Kankley, Kankle, Kakhya, Thona (U.P.).

Conservation Status (IUCN): Least Concern.

Commercial importance: Minor commercial and potential aquarium fish.

Identifying Characters: Body very elongate. Both jaws prolonged into a beak. Dorsal fin inserted nearly opposite to anal fin, dorsal fin with 15 to 18 rays. Anal with 16 to 18 rays. Pelvic fin small, inserted nearer to caudal fin. Lateral line on posterior half of the body. Caudal fin truncate.

Habitat Preference: Freshwaters, primarily rivers. The species recorded from upper-middle stretch of the river in Mandla, Tilwaraghat and Kareli sites.

Species: *Strongylura strongylura* (Van-Hasselt)

Synonyms: *Belone strongylura*, *Belone strongylurus*.

Common Name: Spottail needlefish (English).

Conservation Status (IUCN): Not evaluated (NE).

Commercial importance: Minor commercial fish.

Identifying Characters: Body elongate and rounded. Both jaws prolonged and with sharp teeth. Dorsal fin inserted slightly anterior of anal fin, dorsal fin with 12 to 15 rays. Anal with 15 to 18 rays. Pelvic fin small, caudal fin rounded or truncate.

Habitat Preference: Primarily in coastal areas, also enters estuaries. The species recorded from lower stretch of the river in Bhadbhut and Ambetha sites.

Family: Aplocheilidae

- Upper jaw protrusible
- Dorsal fin short, inserted in the posterior part of the body
- Pelvic fin bases inserted close together
- Lateral line absent on the body

Species: *Aplocheilus panchax* (Hamilton-Buchanan)



Synonyms: *Esox panchax*, *Haplochilus panchax*.

Common Name: Panchax minnow, Blue panchax (English), Dindiya (Gujarat).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: It is a larvivorous fish and its utility lies in mosquito control.

Identifying Characters: Mouth terminal. Cleft of mouth wide, not extending to front border of orbit. Dorsal fin inserted behind posterior end of anal fin, dorsal with 8 soft rays. Anal fin square shaped with 15 to 16 rays. Caudal fin rounded. Scales moderately large, lateral line absent on the body. It is a larvivorous fish and useful for mosquito control.

Habitat Preference: Clear shallow and brackish waters at low altitudes. The species recorded from middle-upper and lower stretch of the river in Tilwaraghat and Bharuch sites.

Order: Perciformes

- Most perciformes have the following characters in common: dorsal, anal and pelvic fin spines present. Pelvic fin with a spine and five or fewer soft-rays (usually 5)
- Caudal fin skeleton with five or fewer hypurals
- No free second ural centrum
- Caudal fin with 17 or fewer principal rays
- No adipose fin
- Scales usually ctenoid; gills 4, a slit behind the last; and branchiostegal rays 7 or fewer

Family: Centropomidae

- Body compressed with a deep caudal peduncle
- Pre-opercle and opercle with a strong spine
- Two dorsal fins, a deep notch between two dorsal fins; spinous part with 7 to 9 strong spines and rayed part with one spine and 10 to 12 soft rays

- Anal and dorsal fins with a scaly sheath
- Caudal fin rounded
- Lateral line curved and complete

Species: *Lates calcarifer* (Bloch)



Synonyms: *Holocentrus calcarifer*.

Common Name: Barramundi (English), Bhetki (West Bengal).

Conservation Status (IUCN): Not Evaluated (NE).

Commercial importance: This perch is esteemed as a food fish.

Identifying Characters: Mouth large, slightly oblique, gape extending to anterior border of eye. Lower jaw longer than upper. Teeth villiform on jaws, some teeth on jaws. First dorsal (spinous) with 7 to 9 strong spines and second dorsal with one spine and 10 to 11 soft rays. Pre-opercle with a strong spine at its angle and lower edge of pre-opercle serrated. Anal fin with 3 spines. Lateral line curved and continued on to caudal fin, lateral line scales 52 to 60.

Habitat Preference: Coastal waters, estuaries and lagoons, including brackish waters. The species recorded from lower stretch of the river in Bhadbhut and Ambetha sites.

Family: Ambassidae

- Body oblong and compressed
- Mouth moderate to large, slightly protrusible; maxilla naked; no supramaxilla
- Dorsal fin deeply divided before last spine, with 7 or 8 spines and 8 to 12 soft rays; anal fin with 3 spines and 8 to 17 soft rays
- Caudal fin forked, with 15 branched rays
- Scales thin and cycloid, rather deciduous; lateral line complete or interrupted
- Gill membranes separate; branchiostegal rays 6

Species: *Chanda nama* (Hamilton-Buchanan)



Synonyms: *Ambassis nama*.

Common Name: Eongate glass-perchlet (English), Chanda, Namchanda (West Bengal), Channe, Chanari, Channa (U.P.), Gaude-Chiri, Kackki-chembardi (Maharashtra).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: Minor commercial and potential aquarium fish.

Identifying Characters: Body ovate, strongly compressed, dorsal and abdominal profile convex. Mouth large, lower jaw prominent. 1st dorsal with 7 spines and 2nd dorsal with one spine and 15 to 17 rays; 2nd spine of 1st dorsal longest. Anal with 3 spines. Caudal fin forked. Lateral line complete with 100 to 107 scales.

Habitat Preference: Inhabits fresh and brackish waters, both in lentic and lotic waters, clear streams, canals, beels, ponds, and inundated paddy fields. The species recorded from upper-middle and lower stretch of the river in Mandla, Tilwaraghat, Jhanaur and Bhadbhut sites.

Species: *Pseudambassis ranga* (Hamilton-Buchanan)



Synonyms: *Chanda ranga*, *Ambassis ranga*.

Common Name: Indian glassy fish (English), Chanda, Ranga-chanda, Chandra, Chanari (U.P.), Kachki, Chedari, Chembardi (Maharashtra).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: Minor commercial and important aquarium fish.

Identifying Characters: Body oblong, deeply compressed. 1st dorsal with 7 spines and 2nd dorsal with one spine and 11 to 14 rays. Mouth oblique, lower jaw more or less equals to upper jaw. Caudal fin forked. Lateral line with 47 to 63 scales.

Habitat Preference: Found in sluggish and standing water. A common species proliferating in impoundments. Most abundant during the rainy season. The species recorded from upper-middle and lower stretch of the river in Mandla, Tilwaraghat, Jhanaur and Sisodra sites.

Family: Teraponidae

- Body oblong and compressed
- Operculum with two spines
- Gape of mouth oblique and jaws equal
- Anal fin short with 3 spines and 7-12 soft rays
- Dark longitudinal strip on body

Species: *Therapon jarbua* (Forsskal)



Synonyms: *Sciaena jarbua*, *Therapon jarbua*, *Holocentrus katakya*.

Common Name: Jarbua terapon (English).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: One of the potential brackish water aquaria.

Identifying Characters: Mouth oblique, body oblong and a little compressed, its dorsal profile more pronounced than ventral. Teeth conical and strong. Gillrakers 12 to 15 on lower arm of first arch. Lateral line with 75 to 100 pored scales, 13 to 17 rows of scales above lateral line and 19 to 24 rows below it. Silvery greyish-blue above, silvery-white below, with 3 or 4 longitudinal downwardly curved black stripes, Fins hyaline; dorsal fin with an intensive

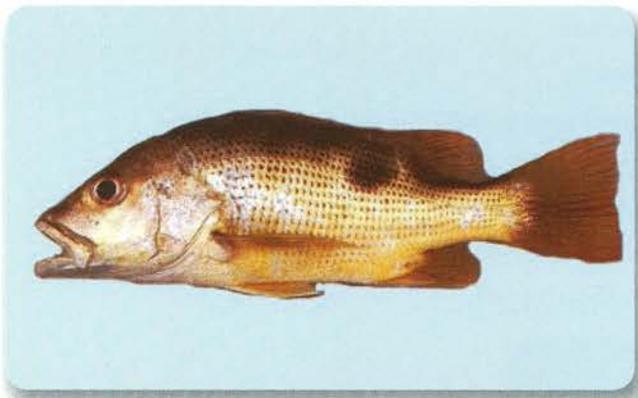
large black spot; caudal fin with dark tips and three horizontal or oblique stripes.

Habitat Preference: Inshore waters and moves considerable distances upstream into freshwaters. The species recorded from lower stretch of the river in Bhadbhut and Ambetha sites.

Family: Lutjanidae

- Mouth terminal, upper jaw protractile
- Dorsal fin continuous, anal fin with 3 spines
- Scales ctenoid, operculum with scales

Species: *Lutjanus johni* (Bloch)



Synonyms: *Anthias johni*, *Lutianus johni*.

Common Name: John's snapper (English).

Conservation Status (IUCN): Not Evaluated (NE).

Commercial importance: No interest to fishery.

Identifying Characters: A fairly deep-bodied species with head profile straight or slightly convex. Preopercular notch shallow. Longitudinal scale-rows above lateral line parallel to it, and those below lateral line horizontal. Silvery-green or bronze/red, with a distinct spot on each scale forming a length-wise series of dark streaks.

Habitat Preference: Inhabits shallow waters and mangrove areas. The species recorded from the lower stretch of the river in Bahdbhut site.

Family: Gerreidae

- Body fairly compressed
- Mouth downward when protracted
- Dorsal fin notched with 9 or 10 spines

- First dorsal and anal spines very short

Species: *Gerres filamentosus* (Cuvier)



Synonyms: *Gerres punctatus*.

Common Name: Whiptail silver-biddy (English).

Conservation Status (IUCN): Least Concern

Commercial importance: Contributes to the artisanal fish catches in the coastal region.

Identifying Characters: Body compressed. Predorsal distance equal to or less than depth of body. Second dorsal spine laterally compressed, produced into a filament whose tip extends past level of first anal spine. Scales moderate; lateral line with 44 to 47 scales. Silvery with 7 to 10 vertical series of ovoid bluish spots on upper portion of sides.

Habitat Preference: Coastal waters, enters brackish waters. The species recorded from the lower stretch of river in Bahdbhut and Ambetha site.

Family: Sciaenidae

- Body oblong to fairly elongate and somewhat compressed
- Dorsal fin long, with a notch between the last and penultimate spines; anterior portion with 8 to 10 (usually 10) spines, and posterior portion with one spine and 21 to 45 soft rays
- Anal fin with 2 spines and 7 to 12 (usually 7) soft rays
- Scales cycloid on head, generally ctenoid on body; lateral line extending to tip of caudal fin

Species: *Pama pama* (Hamilton-Buchanan)



Synonyms: *Bola pama*, *Sciaenoides pama*.

Common Name: Pama (English).

Conservation Status (IUCN): Not Evaluated (NE).

Commercial importance: Contributes minor fishery in the Hooghly estuary (West Bengal).

Identifying Characters: Dorsal fin notched with weak spines. Second anal spine short and weak. Body slender with conical snout. Mouth large and terminal. Pectoral fins pointed, as long as head. Caudal fin rhomboid, very long and tapering in juveniles. Scales cycloid on head, finely ctenoid on most of body; lateral line scales 44 to 48. Light brownish shade along back and silvery-white on belly.

Habitat Preference: Inhabits coastal waters, estuaries and rivers. The species recorded from the lower stretch of the river in Bahdbhut site.

Family: Scatophagidae

- Body quadrangular shaped, very deep and strongly compressed
- Head small, mouth small and not protrusible
- First spine of dorsal procumbent (lying flat)
- A deep notch between 1st and 2nd dorsal fins
- Anal fin with 4 strong spines
- Lateral line distinct and curved

Species: *Scatophagus argus* (Linnaeus)

Synonyms: *Chaetodon argus*.

Common Name: Spotted scat (English).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: It is a aquarium fish.

Identifying Characters: First dorsal with 11 spines and 2nd dorsal with 16 to 18 soft rays. Pectoral fins relatively small. Caudal fin truncate. Lateral line arched. Large round blackish or greenish spots on body.

Habitat Preference: Estuaries and the lower reaches of freshwater rivers, frequently occurring among mangroves. The species recorded from the lower stretch of the river in Bahdbhut and Bharuch sites.

Family: Nandidae

- Body oblong and laterally compressed
- Mouth usually large and protrusible; teeth villiform on jaws and palate
- Dorsal fin large, inserted above pectoral fin base, the spinous and soft-rayed parts continuous; anal fin with 3 or 4 spines and 6 to 9 soft rays
- Pelvic fins thoracic, without scaly axillary process
- Caudal fin rounded
- Branchiostegal rays six

Species: *Badis badis* (Hamilton-Buchanan)



Synonyms: *Labrus badis*, *Badis buchanani*, *Badis dario*, *Badis badis burmanicus*, *Badis badis assamenis*.

Common Name: Badis, Dwarf chameleon fish (English).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: Is an important aquarium fish.

Identifying Characters: Mouth small, lower jaw longer, oblique and slightly protrusible. Operculum distinctly triangular, its posterior corner with a prominent spine. Dorsal fin large with 16 to 18 slender and short spines and 7 to 10 rays. Anal fin with 3 short spines and 6 to 8 rays. Caudal fin rounded. Lateral line interrupted; 26 to 30 scales in longitudinal series. Body with a series of black and dirty red alternate bands in adult fish. A bluish black spot on shoulder, another on opercle and a third near base of caudal fin.

Habitat Preference: Inhabits freshwaters; in rivers, ponds and ditches. The species recorded from the upper-middle stretch of the river in Mandla and Kareli sites.

Species: *Nandus nandus* (Hamilton-Buchanan)



Synonyms: *Coius nandus*, *Nandus marmoratus*.

Common Name: Mottled Nandus (English), Latha, Bheda, Nadosh (West Bengal), Vaadhul, Dhebari (Bihar).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: High priced food fish particularly in West Bengal.

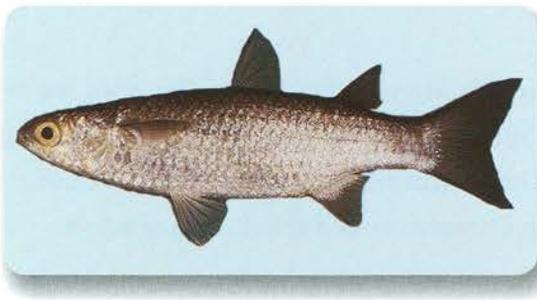
Identifying Characters: Mouth very large, highly protrusible, cleft deep, maxillae reach hind edge of orbit. Operculum triangular with a prominent spine. A single notched dorsal with 12 to 14 spines and 11 to 13 rays, spinous part longer than soft part; dorsal spines strong. Three anal spines. Lateral line interrupted; 46 to 57 scales in lateral line series. Three broad patchy bands over body, a dusky blotch on caudal fin base.

Habitat Preference: Fresh and brackish waters. The species recorded from the upper-middle and lower stretch of the river in Mandla, Kareli and Jhanaur sites.

Family: Mugilidae

- Body moderately elongate, cylindrical or slightly compressed.
- Eyes often partly covered by fatty tissue (adipose eyelid).
- Mouth small and terminal or inferior, either toothless or has small teeth loosely attached to jaws.
- Anal fin with 3 spines (2 in young less than 6 cm standard length).
- Caudal fin moderately forked, emarginate or truncate.
- Scales fairly large on head and body.

Species: *Liza macrolepis* (Smith)



Synonyms: *Mugil macrolepis*, *Mugil poecilus*, *Mugil borneensis*, *Mugil troschellii*, *Mugil troschellii*.

Common Name: Largescale mullet (English), Parshey (West Bengal).

Conservation Status (IUCN): Not Evaluated (NE).

Commercial importance: Good food fish.

Identifying Characters: First dorsal fin inserted usually nearer to caudal fin base than to

snout-tip. Body moderately robust. Teeth labial, feeble, peg like, in two rows on upper lip. Origin of Second dorsal fin on vertical through middle of anal fin base. Scales finely ctenoid. Lateral line Scales 31 to 34, 12 transverse rows of scales. Greenish-grey above, silvery on sides and belly.

Habitat Preference: Shallow coastal waters, estuaries and backwaters. The species recorded from lower stretch of the river in Bharuch, Bhadbhut and Ambetha sites.

Species: *Liza parsia* (Hamilton-Buchanan)



Synonyms: *Mugil parsia*, *Mugil olivaceus*.

Common Name: Gold spot mullet (English), Parsia, Tarui (West Bengal).

Conservation Status (IUCN): Not Evaluated (NE).

Commercial importance: Food fish.

Identifying Characters: Eyes with adipose lids. Short teeth on upper lip only, lower lip toothless. First dorsal fin inserted nearer to snout tip than to caudal fin base. Anal origin about half in advance of the second dorsal. Dorsal and anal fins densely scaled. Caudal fin forked. 31 to 36 scales in lateral series. Colour: Greenish brown above, silvery below.

Habitat Preference: Inhabits shallow coastal waters, estuaries and lagoons; entering tidal rivers. The species recorded from lower stretch of the river in Bhadbhut and Ambetha sites.

Species: *Liza tade* (Forsskal)

Synonyms: *Mugil crenilabis tade*, *Mugil planiceps*, *Mugil belanak*, *Mugil tade*.

Common Name: Tade mullet (English), Bhangam, Dhoka, Parshey (West Bengal), Gandiya (Gujarat).

Conservation Status (IUCN): Not Evaluated (NE).

Commercial importance: A costly food fish.

Identifying Characters: Body slender and elongate. Head depressed and pointed. Adipose tissue covers most of eyes. First dorsal fin inserted nearer to snout-tip than to caudal fin base, second dorsal fin origin on vertical through posterior half of anal fin base. Caudal fin forked. Second dorsal fins densely scaled. Lateral line scale 30 to 35. Greenish-brown colour present above and silvery above.

Habitat Preference: Primarily marine, but entering estuaries and backwaters. The species recorded from lower stretch of the river in Ambetha site.

Species: *Mugil cephalus* (Linnaeus)

Synonyms: *Mugil oeur*.

Common Name: Flathead mullet (English), Parshey (West Bengal), Bodokii (Gujarat).

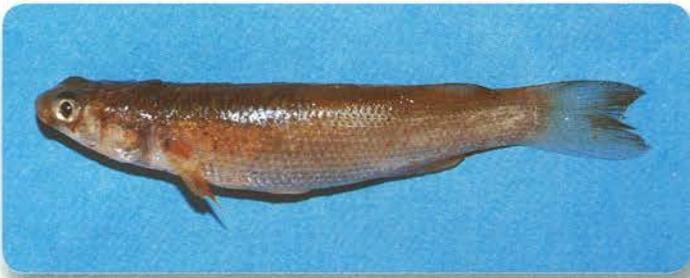
Conservation Status (IUCN): Least Concern (LC).

Commercial importance: An important food fish.

Identifying Characters: Body strong, head broad and much flattened dorsally. Lips thin lower lip with a high symphyseal knob. First dorsal fin inserted nearer to snout-tip than to caudal fin base. Pectoral fin 66 to 74% of head length. Pectoral axillary scale long, 33 to 36% of pectoral fin length. Olive-green on back, silvery on flanks, shading to white below.

Habitat Preference: Inhabits seas, estuaries and rivers. The species recorded from lower stretch of the river in Bhadbhut and Ambetha sites.

Species: *Rhinomugil corsula* (Hamilton-Buchanan)



Synonyms: *Mugil corsula*.

Common Name: Corsula mullet (English), Corsula, Elanga, Kannua (West Bengal), Undula, Answari (Bihar).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: Good food fish.

Identifying Characters: Head depressed, concave between eyes. Eyes prominent, bulging and almost on top of head. Adipose eyelids absent. Mouth distinctly ventral. Jaw teeth indistinct. 1st dorsal fin inserted nearer to caudal fin base than to tip of snout. Caudal fin slightly emarginated. Brownish above, silvery below.

Habitat Preference: Fresh and brackish water. The species recorded from lower stretch of the river in Jhanaur and Bhadbhut sites.

Family: Polynemidae

- Body elongate and compressed
- Eyes cover with adipose tissue
- Two separated dorsal fins
- 7 or 8 flexible spines in first dorsal fin
- Lower section of pectoral fin forms 4 to 7 unattached free rays

Species: *Eleutheronema tetradactylum* (Shaw)

Synonyms: *Polynemus tetradactylus*.

Common Name: Four finger threadfin (English), Guchia, Sahal (West Bengal), Rawas (Gujarat).

Conservation Status (IUCN): Not Evaluated (NE).

Commercial importance: An excellent food fish.

Identifying Characters: Pectoral fin divides into two parts, upper part with all rays simple (unbranched), lower part with 4 free filaments. Body elongate and slightly compressed. Snout prominent and projecting. Mouth very large, with small teeth extending on exterior part of jaws. Caudal fin forked, with lobes equal. A silvery green colour present above whereas yellowish-white on side and belly.

Habitat Preference: Sandy shores and muddy estuaries. The species recorded from lower stretch of the river in Bhadbhut and Ambetha sites.

Family: Gobiidae

- Pelvic fins when well-developed united, usually forming an adhesive or sucking disc
- Body scaled with ctenoid or cycloid scales, often partly or totally absent
- Head canals and pores present or absent
- Teeth variable in size, generally small and conical, in one to several rows on both jaws
- Branchiostegal rays five

Species: *Glossogobius giuris* (Hamilton-Buchanan)



Synonyms: *Gobius giuris*, *Gobius gutum*.

Common Name: Tank goby (English), Bele (West Bengal).

Conservation Status (IUCN): Not Evaluated (NE).

Commercial importance: Contribute a minor fisheries.

Identifying Characters: Body elongate, anteriorly cylindrical and posteriorly compressed. Head depressed, and naked (with scale) between and before eyes. Mouth slightly oblique, lower jaw prominent. Dorsal fins separated, 1st dorsal with 6 weak spines and 2nd dorsal with one spine and 8 to 9 rays. Pelvic fins united forming a disc. One weak anal spine. Lateral line with 21 to 30 scales. Body yellowish-brown with 4 to 5 dark blotches on flank.

Habitat Preference: Primarily freshwater and estuaries; also the sea. The species recorded from upper-middle and lower stretch of the river in Bergi, Tilwaraghat, Kareli, Sisodra and Bhadbhut sites.

Family: Eleotrididae

- Body elongate or oblong but not eel like
- Body and most portions of head scaled
- Pelvic fins widely separated, pelvic with one spine and five rays
- Two dorsal fins, 1st spinous dorsal with 6 flexible spines and 2nd dorsal with 18-19 rays
- Lateral line absent

Species: *Eleotris fusca* (Schneider)

Synonyms: *Poecilia fusca*, *Eleotris cavifrons*.

Common Name: Dusky sleeper (English).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: Of less commercial importance.

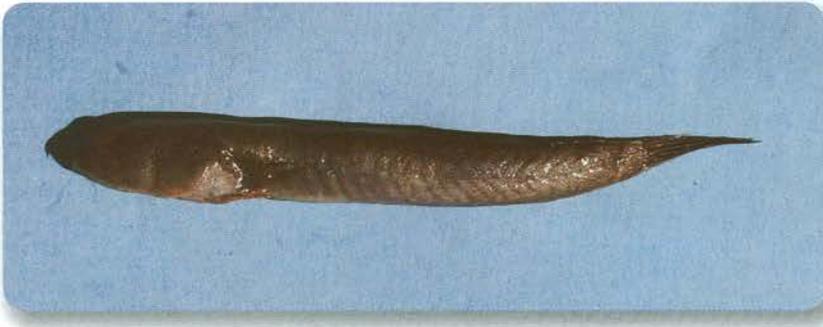
Identifying Characters: Head depressed, top of head, cheeks and opercles scaled; snout and below eyes naked. A single downward curved spine at angle of pre-opercle. Mouth oblique, maxilla extends to below middle of eye. Teeth small and conical in several rows on jaws. Two dorsal fins, 1st dorsal with 6 spines, 2nd dorsal with one spine and 8 to 9 rays. 60 to 68 scales in longitudinal series. Body dark brown to black with numerous horizontal lines on body.

Habitat Preference: Inhabits estuaries. Recorded from lower stretch of the river in Jhanaur and Bhadbhut sites.

Family: Gobioididae

- Body eel like, compressed
- Pelvic fins usually forming an adhesive disc
- Single dorsal fin and anal fin long
- Eyes very small to rudimentary or absent
- Body naked or with cycloid scales

Species: *Odontamblyopus rubicundus* (Hamilton-Buchanan)



Synonyms: *Gobioides rubicundus*.

Common Name: Rubicundus eelgoby (English).

Conservation Status (IUCN): Not Evaluated.

Commercial importance: Minor interest to fisheries.

Identifying Characters: Body very elongate and compressed. Three short barbels on each side below head. Eyes very small, near dorsal profile of head. Mouth oblique, lower jaw prominent. Canine teeth on both jaws. Dorsal, caudal and anal fins continuous. Single dorsal fin with 6 spines and 34 to 40 soft rays. Caudal fin pointed and long. Greenish-olive above, lighter below. Caudal fin black and other fins reddish.

Habitat Preference: Coastal waters and estuaries. The species recorded from lower stretch of the river in d Bhadbhut and Ambetha sites.

Family: Anabantidae

- Body oblong and posteriorly compressed
- Operculum and interoperculum serrate with 2 spines
- Upper jaw weakly protrusible
- Jaws and prevomer with small conical teeth
- Dorsal fin with 16 to 18 strong spines
- Anal fin with 8 to 11 spines
- Caudal fin rounded
- Two lateral lines

Species: *Anabas testudineus* (Bloch)



Synonyms: *Anthias testudineus*, *Anabas scandens*, *Anabas testudineus riveri*, *Anabas testudineus lacustri*, *Anabas testudineus ricei*.

Common Name: Climbing perch (English), Koi (West Bengal).

Conservation Status (IUCN): Data Deficient (DD).

Commercial importance: Highly esteemed food fish.

Identifying Characters: Body elongate and fairly deep. Small conical teeth on jaws and prevomer. Dorsal fin with 16 to 18 spines and 8 to 10 rays. Anal fin with 8 to 11 spines and 9 to 11 rays. Scales large, 21 to 29 scales in lateral series. Two lateral lines. Colour: Light to dark green above, pale yellow to orange below, often with 4 vertical bands of flanks; a distinct black spot on caudal peduncle and a black spot at the base of pectoral fin.

Habitat Preference: Inhabits fresh and brackish waters; mostly in canals, lakes, ponds and swamps, but sometimes occurs in muddy rivers. The species recorded from upper-middle stretch of the river in Bergi, Mandla and Kareli sites.

Family: Belontiidae

- Body rather deep and strongly compressed
- Mouth small, upper jaw protrusible; jaws with teeth, no teeth on prevomer and palatines
- Gill openings rather narrow; pseudobranchiae rudimentary or absent
- Dorsal fin with 4 to 19 spines and 5 to 14 soft rays; anal fin very long-based, often further produced and elongated
- Pelvic fins inserted below base of pectoral fins, often with an elongate ray on each side
- Caudal fin usually rounded, but median rays often produced and lobe-like

Species: *Colisa fasciatus* (Schneider)



Synonyms: *Trichogaster fasciatus*.

Common Name: Striped Gourami, Giant Gourami (English), Khalisha, Cheli (West Bengal).

Conservation Status (IUCN): Lower Risk near threatened (LRnt).

Commercial importance: An attractive aquarium fish.

Identifying Characters: Body oval shaped and strongly compressed. Mouth small, jaws highly protrusible, upper lip thick. Pre-orbital serrate in young stage. Dorsal fin long based with 15 to 17 spines and 9 to 14 soft rays. Anal fin also long based with 15 to 18 spines and 14 to 19 soft rays. Anal fin scaly at base only. Pelvic fins thread like. Caudal fin truncate. Scales large, 29 to 31 in longitudinal series. Lateral line absent. Colour: Greenish with bluish bars on flanks descending obliquely from dorsal to ventral sides. Anal fin with a red margin.

Habitat Preference: Inhabits large rivers and estuaries, also tanks, ditches and ponds. The species recorded from lower stretch of the river in Jhanaur and Bhadbhut sites.

Species: *Colisa lalia* (Hamilton-Buchanan)



Synonyms: *Trichopodus lalius*, *Colisa unicolor*, *Trichogaster lalius*.

Common Name: Dwarf Gourami (English), Khalisha (West Bengal).

Conservation Status (IUCN): Not Evaluated (NE).

Commercial importance: An important aquarium fish.

Identifying Characters: Mouth strongly protrusible. Pre-orbital denticulate. Dorsal fin with 15 to 17 spines and 7 to 10 rays. Anal fin with 17 to 18 spines and 13 to 17 rays. Soft dorsal and anal fins rounded. Caudal fin rounded to truncate. Anal fin densely scaled. Lateral line absent. Colour: Body scarlet crossed by oblique bands of pale blue. Fins with scarlet spots and anal fin with a red margin.

Habitat Preference: Stagnant puddles, stream and rivers. The species recorded from upper-middle stretch of the river in Mandla and Tilwaraghat sites.

Family: Channidae

- Body elongate and cylindrical with long, entirely soft-rayed dorsal and anal fins
- Mouth large with toothed jaws and palate
- Gill-openings wide; gill-membranes confluent with each other but free from isthmus; no pseudobranchiae
- Branchiostegal rays five
- Pelvic fins usually present (absent in some stocks of *Channa orientalis*), with six rays
- Caudal fin rounded
- Scales small, cycloid or ctenoid
- Colour pattern usually in shades of grey, brown and black, often with distinctive markings

Species: *Channa marulius* (Hamilton-Buchanan)



Synonyms: *Ophiocephalus marulius*, *Ophiocephalus leucopunctatus*, *Ophiocephalus pseudomarulius*, *Channa marulius ara*.

Common Name: Giant snakehead (English), Sal, Gajal (West Bengal), Pumurl, Bhor (Bihar).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: A potential sport fish as well as food fish.

Identifying Characters: Mouth large, deeply cleft, maxilla extends behind orbit. Dorsal fin with 45 to 55 soft rays. Anal fin with 28 to 36 soft rays. 60 to 70 scales in lateral series. Colour: Grayish-green above and becoming lighter below, 5 or 6 dark oval blotches on flank. Dorsal and anal fins with white spots, a large black ocellus at upper part of the base of caudal fin. Juveniles with an orange band extending from eye to caudal fin.

Habitat Preference: Large lakes and rivers; prefers deep, clear stretches of water with sandy or rocky bottom. The species recorded from upper-middle stretch of the river in Bergi, Kareli and Tilwaraghat sites.

Species: *Channa orientalis* (Bloch & Schneider)



Synonyms: *Ophiocephalus gachua*, *Ophiocephalus apus*, *Ophiocephalus harcourt-butleri*, *Channa burmanica*, *Ophiocephalus gachua kelaarti*.

Common Name: Asiatic snakehead (English), Cheng (West Bengal).

Conservation Status (IUCN): Not Evaluated (NE).

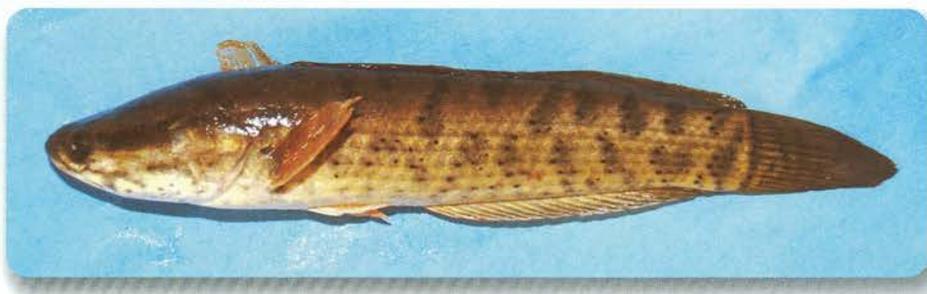
Commercial importance: Food fish.

Identifying Characters: Body elongated and head scales large. Mouth moderately cleft, maxilla reaches to below hind border of eye. Villiform teeth on jaws, 3 large canines on vomer. Dorsal fin with 31 to 37 soft rays. Anal fin with 20 to 24 soft rays. Pectoral fin extends to anal fin. Pelvic length less than 50% of pectorals. 40 to 50 scales in longitudinal series. Usually greenish becoming lighter below. Pectoral fins with a series of distinct alternating

blue and orange vertical bands. Dorsal, anal and caudal fins with scarlet or orange margin, often with a large ocellus on last five dorsal fin rays.

Habitat Preference: Inhabits mountain streams and lowland waters. The species recorded from upper-middle stretch of the river in Bergi, Mandla, Kareli and Tilwaraghat sites.

Species: *Channa punctatus* (Bloch)



Synonyms: *Ophiocephalus punctatus*.

Common Name: Spotted snakehead (English), Taki, Lata (West Bengal), Phool-dhok (Bihar).

Conservation Status (IUCN): Not Evaluated (NE).

Commercial importance: Minor food fish.

Identifying Characters: Body elongate and fairly rounded in cross-section. Eyes moderate, its diameter 7 to 8.5 times in head length. Mouth large; lower jaw with 3 to 6 canines behind a single row of villiform teeth which deepens to 5 or 6 rows at symphysis; villiform teeth on vomer and palatines. Pectoral fins extend to anal fin; pelvic fin about 75% of pectoral fin length. Caudal fin rounded. Scales on summit of head large, rosette of head-scales lies between orbit and hence the frontal head-scale with cephalic sensory-pit in centre forms central plate of rosette; 5 scale rows between preopercular angle and posterior border of orbit; predorsal scales 12; scales 37 to 40 in lateral series.

Habitat Preference: Large freshwater ponds and tanks, derelict and semi derelict waters generally in the plains. The species recorded from upper-middle stretch of the river in Bergi, Mandla, Kareli and Tilwaraghat sites.

Species: *Channa striatus* (Bloch)



Synonyms: *Ophiocephalus striatus*.

Common Name: Banded snakehead (English), Shol (West Bengal), Morrul, Morl, Soura (Bihar).

Conservation Status (IUCN): Not Evaluated (NE).

Commercial importance: An important food fish.

Identifying Characters: Body elongated, scales on head large. Mouth large, lower jaw longer with 4 to 7 canines. Maxilla reaching behind hind border of eye. Dorsal fin with 37-47 rays. Anal fin with 23-29 rays. 50 to 57 scales in lateral series. Colour : Adults grey-green to black-green above, dirty white below. Bands of grey or black from middle of sides to abdomen. Dorsal and anal fins darker in colour than body with dark patches; young with a large black ocellus at the end of base of dorsal.

Habitat Preference: Freshwater ponds, streams and tanks of plains, prefers stagnant muddy waters and grassy tanks. The species recorded from upper-middle stretch of the river in Bergi and Kareli sites.

Family: Mastacembelidae

- Body eel-like and compressed, with a characteristic elongated shape
- Operculum (posterior flap) and sub- and inter-operculum bones thin; often lack spines on preroperculum
- Gill-openings below suboperculum
- Dorsal fin long, preceded by a series of isolated spines (usually 14 to 35); anal fin usually with 2 or 3 spines and 30 to 90 soft rays; no pelvic fins
- Caudal fin distinct, often connected to posterior ray of dorsal or anal fin; if connected (by membrane) caudal finrays extend posterior to, and remain distinct from, last posterior dorsal and anal finray
- Scales small and cycloid

Species: *Mastacembelus armatus* (Lacepede)



Synonyms: *Macrogathus armatus*, *Mastacembelus manipurensis*.

Common Name: Tire-track spiny eel (English), Bam, Bami (West Bengal), Vam, Vat (Maharashtra).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: A food fish.

Identifying Characters: Long fleshy snout with trilobed tip. No spines on pre-orbital or pre-operculum. Dorsal fin inserted far behind tip of pectoral fin. Dorsal fin with 16-23 spines and last dorsal fin spine small. Soft dorsal fin and anal fin separated by a deep notch from caudal. Caudal fin rounded. Lateral line well developed. Colour : Brownish or greenish above and yellowish below, body with two broad pale longitudinal bands extending its entire length. A series of 3-9 large black ocelli along the base of soft dorsal fin. 6 or 8 vertical brown bars on caudal fin.

Habitat Preference: Fresh and brackish waters in plains and hills. The species recorded from upper-middle and lower stretch of the river in Bergi, Mandla, Kareli and Tilwaraghat sites.

Species: *Macrogathus pancalus* (Hamilton-Buchanan)



Synonyms: *Mastacembelus pancalus*.

Common Name: Stripped spiny eel (English), Turi, Pangkal (West Bengal).

Conservation Status (IUCN): Least Concern (LC).

Commercial importance: Little commercial value.

Identifying Characters: Pre-orbital spine strong and pierces skin. Pre-opercle with 2 to 5 spines. Mouth small, teeth on jaws minute. Dorsal fin inserted above middle of pectoral fins. Dorsal fin with 24 to 26 spines. Caudal fin not united with dorsal and anal fins. Greenish-olive above and yellowish below, yellowish-white spots on flanks, posterior part of body often vertically striped.

Habitat Preference: Rivers of plains and estuaries. The species recorded from upper-middle and lower stretch of the river in Bergi, Mandla, Jhanaur and Bharuch sites.

Order: Pleuronectiformes

- Body strongly compressed
- Body not bilaterally symmetrical
- Dorsal and anal fins long
- Head with both eyes on same side either right or left

Family: Cynoglossidae

- Body tongue shaped
- Pre-opercle margin hidden by skin and scales
- Eyes on left side of head, eyes very small and closely placed
- Pectoral fin absent
- No fin spines
- Dorsal and anal fins confluent with caudal fin

Species: *Cynoglossus cynoglossus* (Hamilton-Buchanan)



Synonyms: *Achirus cynoglossus*, *Cynoglossus bengalensis*, *Cynoglossus deltae*.

Common Name: Gangetic tonguesole (English).

Conservation Status (IUCN): Not Evaluated (NE).

Commercial importance: Little commercial value.

Identifying Characters: Snout obtusely pointed, hooked over lower jaw. Eyes with a distinct inter-space. Mouth inferior and contorted (twisted). Teeth only on right (blind) side of jaws. Pelvic fin connected to anal fin. Two lateral lines on ocular side, no lateral lines on blind side. Scales ctenoid on both side of body.

Habitat Preference: Coastal waters; enters estuaries and also fresh waters. The species recorded from lower stretch of the river in Bhadbhut and Ambetha.

Family: Soleidae

- Both eyes on right side of head, eyes small and close together
- Pre-opercle edge covered by skin and scales
- Pectoral fins often absent in adults
- No fin spines
- Scales fairly large, one lateral line on the body

Species: *Euryglossa orientalis* (Bloch & Schneider)



Synonyms: *Pleuronectes orientalis*, *Synaptura orientalis*.

Common Name: Oriental-sole (English).

Conservation Status (IUCN): Not Evaluated (NE).

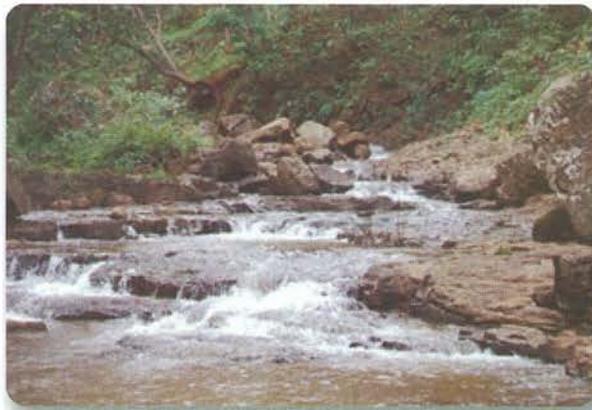
Commercial importance: Little commercial value.

Identifying Characters: Mouth cleft extends to below middle of eye. Pectoral fins present and left pectoral slightly smaller. Mouth small and slightly contorted (twisted). Dorsal and anal fins completely confluent with caudal fin. Pelvic fin not connected with anal. Ctenoid scales on both sides of the body, but lateral line scales cycloid.

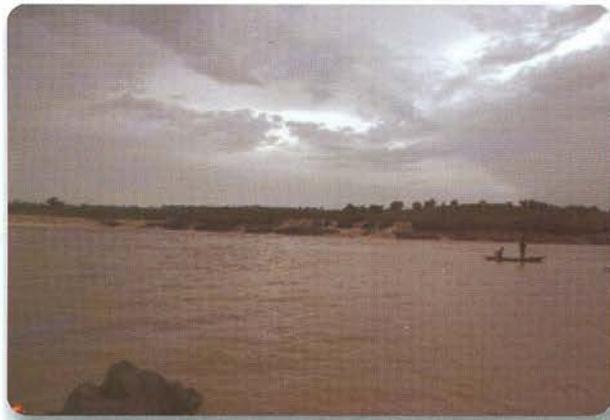
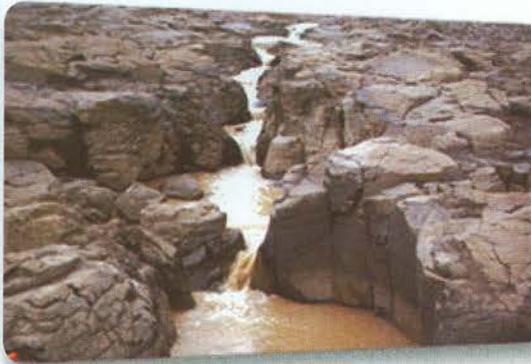
Habitat Preference: Inshore coastal waters; enters estuaries and also fresh waters. The species recorded from lower stretch of the river in Bhadbhut and Ambetha sites.

Fish habitat characteristics of river Narmada

Amakantak (Upper stretch)



Elevation	1043 m.
Width of channel (wetted)	110 m.
Depth (Av.)	16ft.
Water velocity	12 cm./sec
Substrate composition	Clay-30%, Boulders - 45%, Others (gravel, pebbles etc.) - 25%
GPS Coordinates	N 22° 40.678' E 081° 45.173'
Other informations	Narmada originates from a small tank called 'Narmada Kund' located on the Amarkantak hill

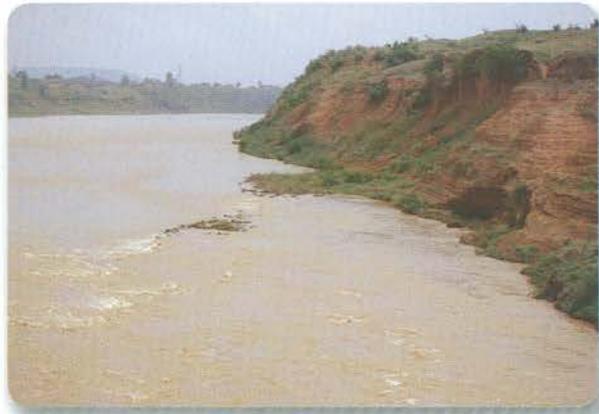
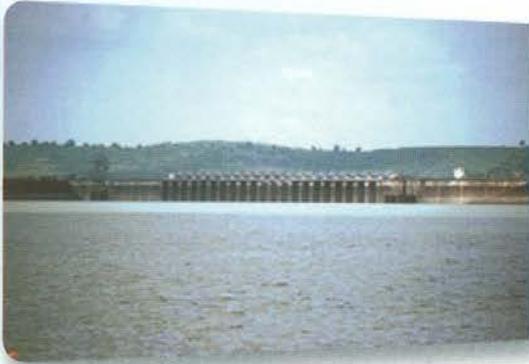
Sahashradhara (Upper stretches near Mandla)

Elevation	452 m.
Width of channel (wetted)	75 m.
Depth (Av.)	31.2 ft.
Water velocity	150 cm./sec
Substrate composition	Clay-10%, Boulders - 75%, Others (Sand, gravel, pebbles etc.) - 15%
GPS Coordinates	Not recorded
Other informations	River with rocky substrate and deep pools

Mandla (Upper stretch)

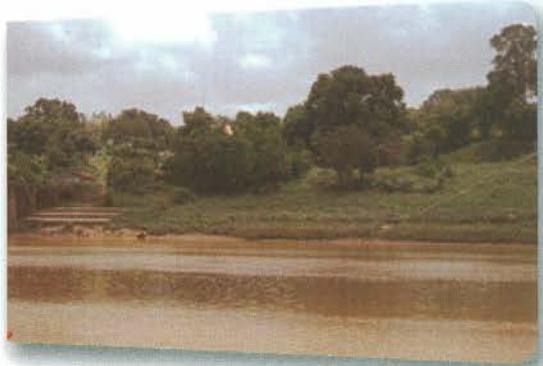


Elevation	441 m.
Width of channel (wetted)	150 m.
Depth (Av.)	17.73 ft.
Water velocity	38 cm./sec
Substrate composition	Clay-60%, Boulders - 15%, Others (Sand, gravel, pebbles etc.) - 25%
GPS Coordinates	N 22° 35.604' E 080° 22.418'
Other informations	Good riparian vegetation in one side and domestic residents in other side. Road bridge under construction across the river

Bergi (Upper - middle stretch)

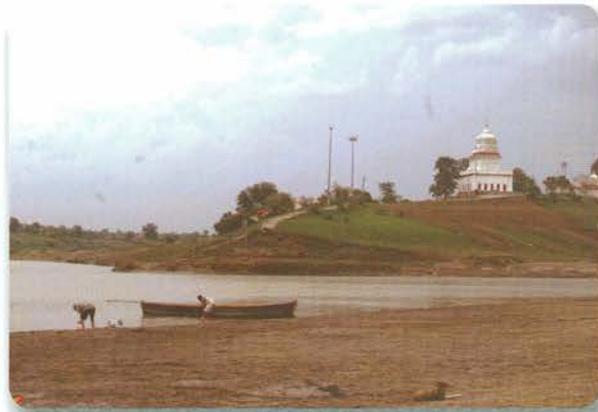
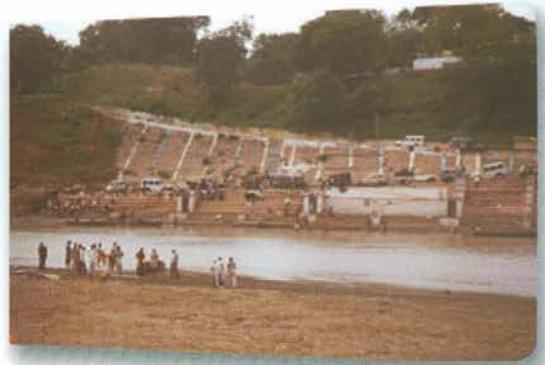
Elevation	459 m.
Width of channel (wetted)	2500 m.
Depth (Av.)	48 ft.
Water velocity	32 cm./sec
Substrate composition	Clay-55%, Boulders - 10 %, Others (Sand, gravel, pebbles etc.) - 35%
GPS Coordinates	N 22° 57.093' E 079° 56.494'
Other informations	Dam constructed on the river

Tilwaraghat (Upper - middle stretch)



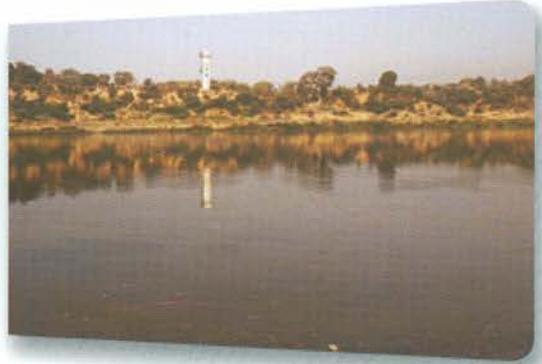
Elevation	392 m.
Width of channel (wetted)	150 m.
Depth (Av.)	6.36 ft.
Water velocity	46 cm./sec
Substrate composition	Clay-75%, Sand 15%, Others(gravel, pebbles etc.) - 10%, rocky substrate in some portion of the river.
GPS Coordinates	N 23° 06.538' E 079° 52.442'
Other informations	Good riparian vegetation present on the river bank, rocky substrate in some portion of the stretch. Bridge constructed across the river

Kareli (Upper - middle stretch)



Elevation	349 m.
Width of channel (wetted)	75 m.
Depth (Av.)	5.23 ft.
Water velocity	52 cm./sec
Substrate composition	Clay-55%, Sand- 30%, Others(gravel, pebbles etc.) - 15%
GPS Coordinates	N 23° 01.699' E 079° 01.027'
Other informations	Ritual activities observed in the bathing ghat

Sisodra (Lower stretch)

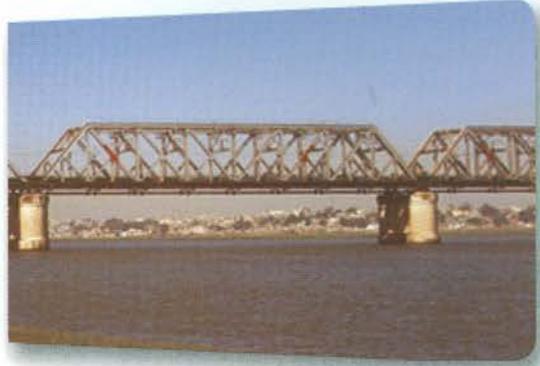


Elevation	12 m.
Width of channel (wetted)	170 m.
Depth (Av.)	8 ft.
Water velocity	35 cm./sec
Substrate composition	Clay-15%, Sand- 40%, Others(gravel, pebbles etc.) - 45%
GPS Coordinates	N 21° 54.843' E 073° 20.778'
Other informations	Meandering nature of the river observed in this site

Jhanaur (Lower stretch)

Elevation	11 m.
Width of channel (wetted)	300 m.
Depth (Av.)	22 ft.
Water velocity	42 cm./sec
Substrate composition	Clay-60- %, Sand- 35%, Others (gravel, pebbles etc.) - 5%
GPS Coordinates	N 21° 50.323' E 073° 07.748'
Other informations	Soil being cutted in the river bank and water lifting observed

Bharuch (Lower stretch)

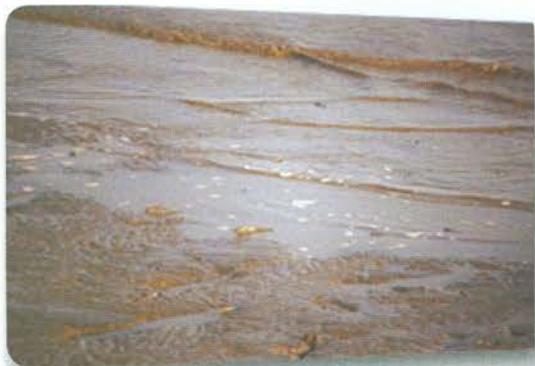


Elevation	6 m.
Width of channel (wetted)	500 m. (During low tide), 900 m. (During high tide)
Depth (Av.)	15 ft. (during low tide), 20 ft. (during high tide)
Water velocity	45 cm./sec
Substrate composition	Clay-70- %, Sand- 15%, Others (gravel, pebbles etc.) - 15%
GPS Coordinates	N 21° 41.366' E 073° 00.401'
Other informations	Soil erosion observed in this site and urbanization observed

Bhadbhut (Lower stretch)

Elevation	5 m.
Width of channel (wetted)	2500 m.
Depth (Av.)	12 ft. (during low tide), 20 ft. (during high tide)
Water velocity	120 cm./sec
Substrate composition	Clay-75- %, Sand- 20 %, Others (gravel, pebbles etc.) - 5%
GPS Coordinates	N 21° 40.869' E 072° 52.721'
Other informations	Sand dunes present and industrial effluents being discharged

Ambetha (Lower stretch)



Elevation	2 m.
Width of channel (wetted)	4000 m. (Mouth of river)
Depth (Av.)	20 ft. (during low tide), 40 ft. (during high tide)
Water velocity	85 cm./sec (synchronized with tide)
Substrate composition	Clay-70- %, Sand & others - 30 %.
GPS Coordinates	N 21° 40.791' E 072° 35.682'
Other informations	Industries commissioned in the river bank

Fishing and sampling activities in different sites



Fishing at Mandla



Fishing operation at Bhadbhut



Fishing activities in Jhanaur



Gill net in operation at Jhanaur



Indigenous fishing practice at Jhanaur



Fishing net (trap) being fixed for catch fish during high tide at Bhadbhut



Fishing activity in Sahashradhara near Mandla



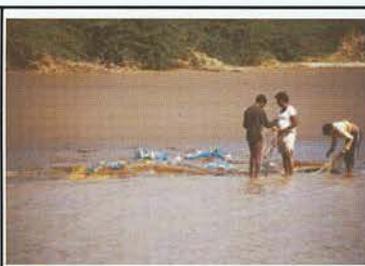
Fishing in upper stretches near Mandla



Fishing in upper stretches near Mandla



Fishing activities in the upper stretch



Fishing activity in Bhadbhut



Fish haul in landing centre at Jabalpur



Fish catch at Sisodra



Fish haul of riverine catch at Tilwaraghat



Sample collection at Ambetha



Sampling in the middle stretch of river



Sampling activity on the river Narmada bank

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