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Revision of the Genus *Labeo* Cuvier from the Indian Region with a discussion on its Phylogeny and Zoogeography (Pisces : Cypriniformes, Cyprinidae, Cyprininae)

K. C. JAYARAM

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ZOOLOGICAL SURVEY OF INDIA

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Revision of the Genus Labeo Cuvier from the Indian region with a discussion on its Phylogeny and Zoogeography (Pisces : Cypriniformes, Cyprinidae, Cyprininae)*

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CONTENTS

INTRODUCTION

Catla, Mrigal and Rohu constitute the major carps of Indian waters. These are of high economic value and because of quick growing nature and rich flesh content, they are extensively cultivated and preferred by the Indian masses. Especially in West Bengal, Bihar, U.P., Assam and also in Bangladesh these are the favourites of the common man. Of the three, Rohu (*Labeo rohita*) is a prime fish associated with religious festivals; marriages etc. Because of their high fecundity, newly married couples are presented with a pair of Rohu fish at the time of the wedding in Bengal.

Despite such popularity and preferences, the taxonomy of the group has remained in confusion. Because of their varied habitats and also extensive cultivation, interbreeding has taken place giving rise to several colour forms, varieties etc. Even inter-specific and intergeneric crosses are known. In our field survey of the Krishna river system we have come across several specimens of black variety of *Labeo rohita* and a red variety of *Labeo calbasu* which fisherman considered as different species. Chaudhuri (1912), Zugmayer (1912), Fowler (1924, 1934 & 1935), Tilak (1968) and Datta & Majumdar (1970) have described new species of *Labeo*. Some species are known only by their holotype and subsequently they have not been recorded.

It is thus seen that the entire gamut of the species of the Indian subcontinent is in need of a thorough taxonomic revision and hence this study was undertaken.

MATERIALS AND METHODS

The material for the present study were collected from different sources which are detailed under each species. Measurements and counts were taken as outlined in Jayaram (1981). See fig. 1.

All the 28 species of *Labeo* dealt with here have been divided into eight groups and for each group their common characters and differentiating characters are tabulated. Vernacular names as far as known, number of specimens studied, diagnosis, description of species, distribution, scale counts, gill rakers if taken, maximum size of the specimen, relationship with other *Labeo* species dealt with, and remarks if any, are arranged according to almost the same order so that comparisons may be made easily.

For species of which more than one specimen is studied and description presented, arithematic ranges are shown in the bracket; outside the bracket is the mean. Synonyms are presented as exhaustive as possible. Artificial keys to all the species known from the Indian region are given in the present work. Bionomics of some popular species have been considered.

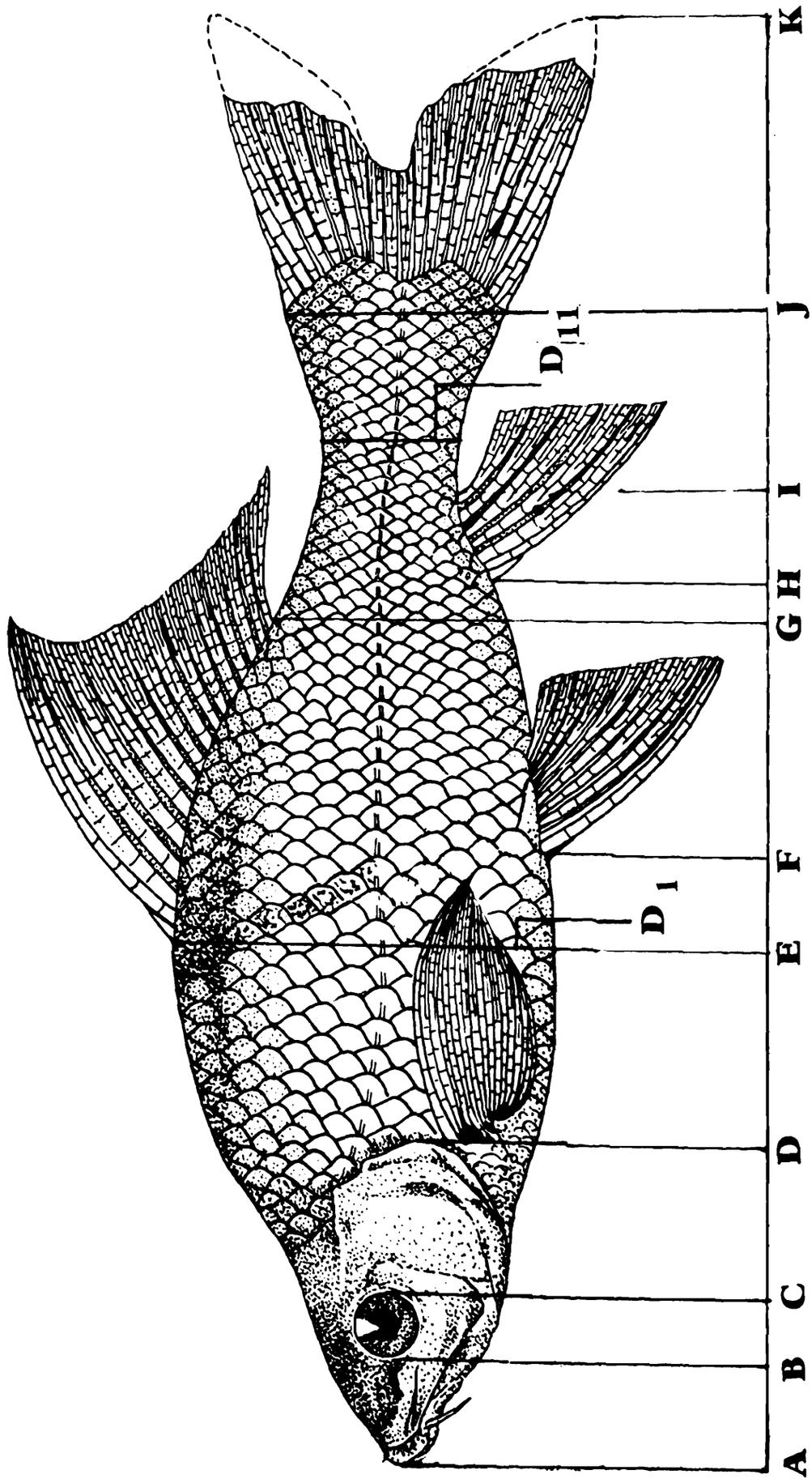

Fig. 1. Diagram showing different body measurements of *Labeo sp.*

ACKNOWLEDGEMENTS

As a part of an assignment to write Fauna of India volume on Cyprininae, the senior author completed a revision of the genus *Puntius* and the major part of the genus *Labeo*. Due to certain reasons the latter assignment could not be completed. During the course of the project on the Krishna river system specimens of different species of *Labeo* were collected. The second author was assigned the revision of the genus *Labeo* for his doctoral work under the guidance and supervision of the first author. The work was done in the laboratory of ZSI, Marine Biological Station, Chennai, for which both the authors are grateful to the officers-in-charge and also to the Director of ZSI for facilities. The second author is indebted to doctors M.R. Chandran, Department of Zoology, Bharadidasan University, Tiruchi, A.G.K. Menon, Emeritus Scientist, ZSI, Chennai, J.T. Jyothi Nayagam, M. Srinivasan, P. Krishnamoorthy, Mrs. Rema Devi, Mrs. T.J. Indra and M.B. Raghunadhan for their help. The drawings were done by Sri Sengupta, Senior Artist, and photographs by Sri Seshan, Photographer, ZSI, Chennai. Both authors are grateful to Dr. Martin R. Brittan and Dr. Katre Shakuntala for their suggestions and criticisms.

ABBREVIATIONS AND CONDENSATIONS

HCPD - Height of Caudal Peduncle
IOW Inter-orbital width
LH - Head Length
SD - Standard Deviation
TL - Total Length
Ht. at occpt. - Height of occiput
LCPD - Length of Caudal Peduncle
Ll Lateral line
SL Standard Length

HISTORICAL RESUME

Cuvier (1816) in his treatise *Le Regne Animale* proposed the genus *Labeo* to accommodate *Cyprinus niloticus* from the Nile, Africa. Hamilton (1822) in his "III division - Cyprinus Bangana" alluded that the "six last species of this division are so nearly allied to each other, that several of them probably merely accidental varieties, although that could not be ascertained without a more careful investigation" (p. 277). These six species are *Cyprinus acra (Labeo bata), Cyprinus ariza, Cyprinus bata, Cyprinus boga, Cyprinus cura (Labeo bata)* and *Cyprinus pangusia.* Day (1878) correctly referred *Bangana* as a synonym of *Labeo.* Valenciennes (1842) established a separate genus *Rohita* with *Rohita buchanani* as the type, which Day (1878) synonymised under *Labeo.* Heckel (1843) proposed *Tylognathus* for *Varicorhinus diplostomus,* based on the length of dorsal fin, which genus Gunther (1868) considered as artificial, but did not merge, which however Day (1878) did. Similarly, such genera as *Diplocheilus* Van Hasselt (1823), *Diplocheilichthys* Bleeker (1859), *Gobionichthys, Hypselobarbus* Bleeker (1859), *Lobocheilus* Van Hasselt (1823), *Nandina* Gray(1831), *Rohitichthys* Van Bleeker (1859) and *Schismatorhynclus* Bleeker (1863) were considered invalid by Day (1878).

For instance, the genus name *Lobocheilus* proposed by Van Hasselt (1823) for *Lobocheilus falcifer,* was described by Bleeker (1863). However, *Lobocheilus* is distinct from *Labeo* not only

in general form but also in the character of the lower lip forming a free and rounded lobe to receive the upper lip upon the posterior part of its upper surface. Day, was thus incorrect in considering *Lobocheilus* as a synonym of *Labeo* Cuvier.

Schismatorhynchos Bleeker, with a clear deep groove passing from one orbit to another with two horns or projections on the space between the eyes, is again unique in that no other species of *Labeo* shares this feature. It was Day (1878) who stabilized the generic use of the name *Labeo* and this became accepted. It is, however, surprising to note that Hora (1936) used the long forgotten name *Bangana* in his checklist of fishes from Chitaldurg District, Mysore. Yazdani (1992) has also used this name without reason.

Although apparently well defined and appearing as if a comprehensive group, *Labeo* throws up some problems of inter-specific relationships which necessitate splitting the genus into more smaller units. The 28 species of the genus have been rearranged into 8 groups based on the morphological characters.

EVALUATION OF CHARACTERS

In any taxnomic exercise involving revisionistic studies of highly variable genera such as *Labeo*, an evaluation of meristic and morphometric characteristics is a prerequisite. Most cyprinid genera have too many generalised characters and morphological features to differentiate them easily, particularly for a fishery field worker. Clear cut characters are few and a certain amount of overlapping is inevitable; particularly as fishes of the genus *Labeo* are highly generalised, with much intra and inter-specific variation, so much so that a diagnosis of a species on pin point features is nearly impossible. However, some of the morphological characters which are commonly adopted are discussed below.

Body depth : This is a highly variable character, related to length, of such fish species as *L. boga* and L. *boggut*, having generally low body depth, unlike the species like *L. nandina*, *L. fimbriatus*, *L. kontius*, *L. potail* etc., which have deep body. The body depth in relation to standard length is generally quite variable. Fishes which grow to a long size may or may not have a high body depth. We have seen specimens from Krishna, such as *L. calbasu* and *L. rohita* grown from ponds, having a higher body depth than the riverine catches. As such, body depth in terms of standard length can be used only a limited way.

Eyes : The position of the eye can be found useful in differentiating even genera, especially in Siluroids and Poecillids. Jayaram (1955) established the genus *Horabagrus* (Family Bagridae), utilising the low position of eye. In the case of cyprinids most genera have the eyes placed supralaterally, as most of the fishes are surface and coloumn feeders. In the case of *Labeo* species such as *L. calbasu*, *L. fimbriatus* and *L. potail*, the eye is placed low, while species such as *L. boga* and *L. boggut*, etc, have the eye position supralateral. The size of the eye also varies, depending upon the habitat. Specimens of *L. calbasu* grown in ponds with poor light tend to have varying eye sizes. This character also is unreliable in the case of *Labeo*.

Lip structure : The generic name *Labeo* is evidently derived with reference to the lip of the fish. The lip structure is highly variable in both inter and intraspecifically. Species such as *L. dyocheilus*, *L. kontius* and *L. potail* have highly fimbriated lips with pronounced labial folds, whereas species such as *Labeo ariza*, *Labeo bata* and *Labeo boga* have plain, simple lips. Hora and Mukerji (1936) have shown that the lower lip of *Labeo dero* is studded with papillae, unlike *Labeo dyocheilus* which has striations (Hora, 1936). Even among the individuals of *Labeo calbasu* the lip structure is highly variable. As such, the character has limited value.

Rostral fold : The snout in cyprinid fishes is an important part bearing the nostrils. Genera as *Crossocheilus*, *Nukta*, *Osteocheilus* and *Cirrhinus* are characterised chiefly on the modification of snout. In fact the genus *Schismatorhynchos* is derived from *Labeo* and shows many characters of the latter genus but for the modification in snout structure. The rostal fold in *Labeo spp.* is much generalised, except in species like *L. calbasu*, *L. dyocheilus*, *L. kontius*, *L. nigrescens*, *L. pangusia* and *L. porcellus* where it is pronounced. Some species do exhibit nuptial tubercles, but this is seasonal, not constant. Here again the character is of limited use.

Position of fins : The place or position of insertion of the median dorsal fin and paired pelvic, pectoral fins is of some importance. Some of the cyprinids as *Chela*, *Securicula* and *Oxygaster* are separated by the position of insertion of dorsal fin. Genera like *Semiplotus* and *Dangila* are chiefly characterised by anteriorly-inserted dorsal fin. However, in the case of *Labeo* the dorsal fin is mostly inserted midway between tip of snout and end of caudal peduncle, as is also the pelvic fin.

Fin rays : The count of the dorsal fin rays, both simple and branched and also that of caudal fin has some value. The frequency-distribution chart given at the end indicates the number of simple and branched rays in both dorsal and anal fins, which shows that the number of simple rays is important and can be utiized for separating groups of species. The counts of the pectoral and the pelvic fins are not significant.

No. of gill rakers : This is also an useful character but can be used only at a specific level. The gill raker counts for most species of *Labeo* in both upper and lower limb of the first gill arch are given in the table below :

Scale counts : This is an important character especially in *Labeo*. Species such as *Labeo boggut*, *Labeo gonius* and *Labeo dussumieri* have large numbers of small scales, while most species such as *L. boga*, *L. dero*, etc, have 36-42 medium sized scales, corresponding number of scales between L.l./pelvic and L.l./anal. Predorsal, preanal, circumpeduncular scale counts are of value. These counts have been adopted by many workers. Other characters such as sensory papillae, barbels, colour, and shape of the caudal fin are all highly variable and are of only limited use in the case of *Labeo*.

1.	L. angra	6-15/25-43	15.	L. fisheri	15/47
2.	L. ariza	4-8/26-28	16.	L. gonius	6-15/38-55
3.	L. bata	6-9/23-26	17.	L. kawrus	4-5/24-26
4.	L. boga	7-8/30-33	18.	L. kontius	8-10/29-32
5.	L. boggut	6-10/25-29	19.	L. microphthalmus	—
6.	L. caeruleus	7-9/32-33	20.	L. nandina	8-9/27-28
7.	L. calbasu	9-14/31-36	21.	L. nigrescens	9-11/30-34
8.	L. dero	4-8/26-28	22.	L. nigripinnis	7/29
9.	L. devdevi	4-8/26-28	23.	L. pangusia	4-8/26-29
10.	L. diplostomus	5-6/25-26	24.	L. porcellus	4-5/30-32
11.	L. dussumieri	18-19/52-54	25.	L. potail	14-15/48-49
12.	L. dyocheilus dyocheilus	5-6/26-39	26.	L. rohita	13-20/42-60
13.	L. dyocheilus pakistanicus	—	27.	L. stoliczkae	7-8/51-53
14.	L. fimbriatus	13-27/41-67			

SYSTEMATIC ACCOUNT

Genus *Labeo Cuvier*, 1816

Labeo Cuvier, *Regne Animale*, **2** (ed.1) : 194, 1816 (type-species : *Cyprinus niloticus* Forsskal 1775 = *Cyprinus rufescens* Hasselquist). Cuvier and Valencinnes, *Hist. nat. Poiss;* **16** : 335, 1842. Heckel, *Russegger's Reise*, **2**: 1024, 1843. Gunther, *Cat. Fish. Brit. Mus;* **7** : 45, 1868. Beavan, *HBk. F.w. Fish. India*, p.60, 1877 (description of the species). Day, *Fish. India*, : .534, 1878 (geographical distribution given as Tropical Africa, Syria, throughout fresh waters of India, Ceylon and Burma, to the Malay Archipelago). Day, *Faun. Brit. Ind. Fish*; **1**: 256, 1889 (description and locality). Boulenger, *Poiss. Bass. Congo*, : 209, 1901. Boulenger, *Fish. Nile*, : 160, 1907. Boulenger, *Cat. F.w. Fish. Africa*, **1**: 300, 1909 (Southern Asia and Africa). Chaudhuri, *Rec. Indian Mus;* **6**: 15, 1911 (Yunnan). Raj, *Rec. Indian Mus;* **12**: 253, 1916 (Madras). Annandale, *Rec. Indian Mus;* **16**: 117, 1919 (Bombay). Annandale and Hora, *Rec. Indian Mus;* **18**(4): 169, pl.3, 1920 (Seistan). Fowler, *Proc, Acad. nat. Sci. Philad;* **76**: 94, 1924 (some North Indian fishes). Hora, *J. Bombay nat. Hist. Soc;* **32**(1): 113, 1927 (Satara). Mukerji, *Rec.*

Indian Mus; **37**: 231, 233, 1935 (Andaman islands; introduced). Hora, *Mem. Conn. Acad. Arts. Sci;* New Haven, **10**: 299, 1936 (name only). Shaw and Shebbeare, *J. Asiat. Soc. Beng;* **3**: 50, 1937 (description of the genus *Labeo*). Nazir Ahmad, *Bull. Punjab Univ. Dept. Zool;* **1**: 267, 1943 (description, key to species, Lahore). Hora, *J. zool. Soc. India,* **1**: 3, 1949 (Rihand river). Hora, *Mem. Indian Mus;* **14(2)** [1956]: 77, 82, 1957 (name only). Misra, *Rec. Indian Mus;* **57** : 159, 1959 (genus description). Bhuiyan, *Fish. Dacca,* p.20, 1964 (description, key to species, Dacca, Bangladesh). Mirza, *Biologia,* **16(2)**: 77, 1970 (Lahore). Islam and Siddiqi, *Biologia,* **17**(1): 31, 1971 (key to species, Jhelum river, Pakistan). Ataur Rahman, *Bangladesh J. Sci. Ind. Res;* **9**(3&4): 200, 1974 (checklist of fishes of Bangladesh). Menon, *Inl. Fish. Soc. India Spl. Publ;* (1): 30, 1974 (checklist of fishes of Himalayan and Indo-Gangetic Plain). Murthy, *Proc. Indian Acad. Sci;* **85B(3)**: 134, 1977 (key to species, Lake Kolleru). Shrestha, *Fish, Nepal,* : 64, 1981 (description of the genus). Jayaram, *HBk. F.w. Fish. India,* : 116, 1981 (key to species). Mirza, *Fish. Lahore,* **7**: 1982 (key to species). Mirza and Omer, *Biologia,* **30(1)**: 79, 1984 (key to species, Baluchistan). Johal and Tandon, *Punjab fish. Bull;* **3(2)**: 8 1987 (key to species, Punjab). Mirza and Ahmad, *Biologia,* **33(2)**: 257, 1987 (key to species, river Jhelum, Pakistan). Mirza, *Sci. Int;* **1(3)**: 204, 1989 (name only, distribution). Talwar and Jhingran, *Inland Fish;* **1**: 193, 1992 (key to species, description and distribution).

1822 : *Bangana* Hamilton, *Fish Ganges,* : 385 (type-species : *Cyprinus dero* Hamilton).

1822 : *Morulius* Hamilton, *Fish Ganges;* : 391 (type-species : *Cyprinus morala* Hamilton).

1823 : *Lobocheilus* Van Hasselt, *Allg. Konst. Letter-Bode II Deel* (35): 133 (type-species : *Lobocheilus falcifer* Van Hasselt).

1823 : *Diplocheilus* Van Hasselt, *Allg. Konst. Letter-Bode II Deel* (35): 329 (type-species : *Diplocheilus erythopterus* Van Hasselt).

1831 : *Nandina* Gray, *Zool. Misc;* : 8, (type-species : *Cyprinus nandina* Hamilton).

1842 : *Rohita* Valenciennes, *Hist, nat. Poiss:* **16**: 242 (type-species : *Cyprinus rohita* Hamilton).

1842 : *Tylognathus* Heckel, *Ichthyologie,* : 1073 (type-species : *Tylognathus diplostomus,* Heckel).

1859 : *Rohitichthys* Bleeker, *Nat. Tijdschr. Neder-Indie,* **20**: 424 (type-species : *Labeo senegalensis* Cuvier and Valenciennes).

1859 : *Tambra* Bleeker, *Nat. Tijdschr. Neder-Indie,* **20**: 430 (type-species : *Cyprinus abramioides* Sykes).

1859 : *Diplocheilichthys* Bleeker, *Nat. Tijdschr. Neder-Indie,* **20**: 423, (type-species : *Lobocheilus pleurotaenia* Bleeker).

1859 : *Hypselobarbus* Bleeker, *Nat. Tijdschr. Neder-Indie,* **20**: 430 (type-species : *Hypselobarbus typus* Bleeker).

1863 : *Rohitodes* Bleeker, *Neder. Tijdschr. Dierk,* **1**: 195 (type-species : *Labeo cephalus* Cuvier and Valenciennes).

Body small or moderate sized, elongated to deep with abdomen rounded. Head fairly large. Snout more or less swollen, rounded or truncated, often projecting beyond mouth, covered with or without tubercles and a groove across, mostly overhanging the mouth. Mouth moderate or narrow, curved, semilunar, somewhat inferior, rarely anterior. Jaws with a sharp margin and with a soft movable horny covering which may be thick or thin. Eyes moderately large, generally placed at the commencement of the posterior half of the head, not visible from below the ventral surface; lips thick, fleshy, fringed, covering both jaws, continuous at the angle of mouth forming a labial fold. Postlabial groove continuous or not continuous. barbels always present, one or two pairs; if one pair, it is only maxillary and not rostral; the second pair, if present, is rostral. Pharyngeal teeth hooked in three rows, generally 5, 4, 2/2, 4, 5. Dorsal fin inserted above anterior origin of pelvic fins with 11 to 26 rays and without any osseous rays. Anal fin short with seven or eight rays (five branched). Caudal fin deeply forked or emarginate. Scales large, moderate, or small, with numerous striae. Lateral line complete, straight or little curved, running in the centre of the peduncle up to tail.

A genus with many species in Africa, widely distributed in south and south east Asia.

Key to species*

1. Lateral line scales 50-85. 2
   Lateral line scales less than 50. 4

2. Dorsal fin rays 11 or 12; lateral line scales 55-65; only one pair of barbels. ..*L. boggut*
   Dorsal fin rays 15-18; two pairs of barbels. 3

3. Lateral line scales 50-55; 8 or 9 parallel brownish stripe above and below the L.l. .....
   ..... *L. dussumieri*
   Lateral line scales 65-84; scales darkest at their margins. ..... *L. gonius*

4. Lateral line scales 40 or less than 40. 5
   Lateral line scales more than 40. 14

5. Branched dorsal fin rays 14-15. Two pairs of barbels. 6
   Dorsal fin rays in total 11-14 or even rarely 15 but not more; only one pair of barbels.
   8

6. Lateral line scales 36-37. Dorsal fin rays 16-18 in total. Snout rather swollen and rounded, somewhat projecting over lower jaw. Lateral lobe small. ..... *L. nigrescens*
   Lateral line scales 38-42. Branched dorsal fin rays 12-14. 7

7. Snout rather projecting. ..... *L. porcellus*
   Snout blunt, truncated. ..... *L. kontius*

* *L. gedrosicus* not given in key for want of details.

8. Pectoral fin as long as head excluding snout length. 9
Pectoral fin as long as head or nearly so. 10

9. Dorsal fin with 14 rays, inserted nearer the snout than base of caudal fin. .....
..... *L. caeruleus*
Dorsal fin with 11 rays, inserted midway between tip of snout and posterior extremity of anal fin. ..... *L. nigripinnis*

10. Snout blunt, truncated, overhanging the mouth; with lateral lobe. ..... *L. potail*
Snout overhanging mouth without any lateral lobe. 11

11. Dorsal fin inserted midway between tip of snout and posterior extremity of anal fin. snout overhanging mouth but without lateral lobe; scales between L.l./pelvic fin $4^1/_2$. .....
..... *L. kawrus*
Dorsal fin inserted nearer snout than caudal fin; snout without lateral lobe; scales between L.l./pelvic fin $5\text{-}6^1/_2$. 12

12. Eye diameter 5.5 in head length; 2.0 in snout length; scales between L.l./pelvic fin $5^1/_2$-$6^1/_2$. ..... *L. ariza*
Eye diameter 3.75-4.5 in head length; 1.0-2.0 in snout length. 13

13. Snout moderately projecting beyond jaw; lips thin. A thin layer of cartilaginous covering to inner surface of lower jaw; lower lip plain; scales between L.l./pelvic fin $5\text{-}5^1/_2$ .....
..... *L. boga*
Snout conical and projecting, lips thin; lower lip with inner cartilaginous covering. Lower lip fringed. Scales between L.l./pelvic fin $6\text{-}6^1/_2$. ..... *L. bata*

14. Dorsal fin rays 15 and above. 15
Dorsal fin rays less than 15. 19

15. Dorsal fin rays 24-27. Upper edge of dorsal fin convex. ..... *L. nandina*
Dorsal fin rays 15-22. Upper edge of dorsal fin concave. 16

16. Only one pair of maxillary barbels. Dorsal fin 15 or 16. ..... *L. stoliczkae*
Two pairs of barbels. Dorsal fin rays 14-22. 17

17. Dorsal fin inserted nearer the tip of snout than base of caudal fin. Dorsal fin rays 17-22.
..... *L. fimbriatus*
Dorsal fin inserted midway between tip of snout and caudal fin base. 18

18. Dorsal fin rays 15-18. Pectoral fin as long as head length; body deep; mouth distinctively inferior, wide. ..... *L. calbasu*
Dorsal fin rays 14-16. Pectoral fin as long as head excluding snout. Body oblong. Mouth terminal, narrow. ..... *L. rohita*

19. Cartilage on inner side of entire lip is rudimentary. 20
Cartilage on inner surface of entire lip is well developed 21

20. Labial fold continuous, L.tr. 7/8. A short or flab-like maxillary pair of barbels only; body oblong and narrow. ..... *L. angra*
Labial fold discontinuous; L.tr. $7^1/_2/5^1/_2$ A pair of definite maxilary barbels. (Sometimes rudimentary rostral barbels hidden in the lateral groove) ..... *L. fisheri*

21 Dorsal fin inserted midway or equal distance between tip of snout and base of caudal fin. 22
Dorsal fin inserted nearer the tip of snout than base of caudal fin. 23

22. Snout overhanging mouth, not swollen. Lateral lobe indistinct. Eye small in relation to head length. ..... *L. microphthalmus*
Snout muscular, blunt not overhanging, lateral lobe distinct. Eye big in relation to head length. ..... *L. dyocheilus pakistanicus*

23. Scales between L.l. and pelvic fin 6-8. Snout with groove in young and adult. 24
Scales between L.l. and pelvic fin $5^1/_2$ or $6^1/_2$. Snout without groove in young. 25

24. Labial fold continuous. L.tr. 7/7. Eye is bigger in relation to standard length..... *L. dero*
Labial fold discontinuous. L.tr. 8/9. Eye is smaller in relation to standard length. ..... *L. diplostomus*

25. Lateral lobe distinct, thick. Snout with groove in the adult. Circumpeduncular scales 19-23. ..... *L. dyocheilus dyocheilus*
Lateral lobe indistinct. Snout without any groove; Circumpeduncular scales 19-24..... 26

26. Scales between L.l. and pelvic fin $6-6^1/_2$. LH/Eye 3.8 to 5.8; Iow/Eye 1.1 - 2.2. ..... *L. pangusia*
Scales between L.l. and pelvic fin $5^1/_2$ - $6^1/_2$. LH/Eye, 3.5-4.4; Iow/Eye 1.3 - 1.7. ..... *L. devdevi*

Group - I
THE *GONIUS* GROUP

This group comprises the following species :

1. *Labeo gonius* (Hamilton, 1822, p.292)
2. *Labeo boggut* (Sykes, 1841, p.359)
3. *Labeo dussumieri* (Valenciennes, 1842, p.258)

Common characters of these species are as below :

1. Snout without any depression, except in young ones of *L. boggut.*
2. Rostral fold not fleshy
3. Both lips fringed, continuous at the corner of the mouth
4. Postlabial groove present, except *L. boggut* in which a small depression alone is present
5. One or two pairs of barbels
6. Mouth narrow, except *L. boggut* in which mouth is cresentic
7. Dorsal fin with ii or iii simple rays
8. Lateral line scales 50-80
9. Predorsal scales 16-25
10. Prepelvic scales 14-24
11. Preanal scales 30-57
12. Scales between dorsal fin/Ll. $8^1/_2$-14
13. Scales between delvic fin/Ll. $5^1/_2$-13
14. Scales between anal fin/Ll. $5^1/_2$-11
15. Circumpeduncular scales 21-32
16. Gill rakers 6-19/25-55

The following is the comparative table of the differences between the three species of the group :-

	Dorsal fin	Ll. scales	Predorsal scales	Prepelvic scales	Preanal scales	Dorsal fin/Ll.	Pelvic fin/Ll.	Anal fin/Ll.	Circum-peduncular scales
Labeo gonius (Hamilton)	ii, 14-16	65-80	20-25	18-23	44-57	12-14	$10^1/_2$-13	$8^1/_2$-11	25-28
Labeo boggut (Sykes)	ii, 9-10	55-65	19-22	18-24	35-39	$10^1/_2$-$12^1/_2$	$8^1/_2$-9	$8^1/_2$-$9^1/_2$	26-32
Labeo dussumieri (Valanciennes)	ii-iii, 12-14	50-55	16-17	14-16	30-34	$8^1/_2$-$9^1/_2$	$5^1/_2$-$6^1/_2$	$5^1/_2$-$6^1/_2$	21-23

Labeo gonius (Hamilton)

(Fig. 2)

1822 : *Cyprinus gonius* Hamilton, *Fish. Ganges,* : 292, 387, pl.4 fig. 82, (type-locality : freshwater rivers and ponds of Bengal). McClelland, *Asiat. Res;* **19**: 325, 1839.

1842 : *Rohita gonius*, Valenciennes (in Cuvier and Valenciennes), *Hist. nat. Poiss;* **16**: 259.

1842 : *Rohita cursis* Valenciennes (in Cuvier and Valenciennes), *Hist. nat. Poiss;* **16**: 265.

1868 : *Labeo microlepidotus* Valenciennes (in Cuvier and Valenciennes), *Hist. nat. Poiss;* **16**: 352, 1842. Gunther, *Cat. Fish. Brit. Mus;* **7**: 60 (Rangoon).

1868 : *Labeo cursa* Valenciennes (in Cuvier and Valenciennes), *Hist. nat. Poiss;* **16**: 361, 1842. Gunther, *Cat. Fish. Brit. Mus;* **7**: 60 (Bengal and Nepal).

1842 : *Labeo curchius* Valenciennes (in Cuvier and Valenciennes), *Hist. nat. Poiss;* **16**: 363.

1853 : *Rohita chalybeata* Bleeker, *Verh. Bat. Gen;* **25**: 133.

1861 : *Rohita microlepidota*, Gunther, *Proc. zool. Soc. Lond;* p.225.

Labeo gonius, Day, *Proc. zool. Soc. Lond;* : 372, 1869 (Rivers of Orissa). Beavan, *HBK. Fw. Fish. India*, : 63, 1877 (Bengal). Day, *Fish. India*, : 537, 1877 (Indus in Sind through the North-West Provinces, Bengal and Orissa to Ganjam as low as the Kistna, Assam and Burma). Day, *Fauna Brit. Ind. Fish;* **1**: 261, 1889 (Sind, North-West Provinces, Bengal, Orissa to Ganjam as low as Kistna, Assam and Burma). Vinciguerra, *Ann. Mus. Civ. Stor. nat. Gen;* : 268, 1889 (Burma). Chadhuri, *Rec. Indian Mus;* **6**: 23, 1911 (Yunnan and its immediate neighbourhood). Chaudhuri, *Rec. Indian Mus;* **8**: 244, 1913 (name only). Prashad and Mukerji, *Rec. Indian Mus;* **31**: 162, 165, 168, 1931 (Indawgyi Lake, Burma). Shaw and Shebbeare, *J. Asiat. Soc. Beng;* **3**: 54, pl.2, fig.3, text-fig.5, 1937 (North Bengal). Hora, *Rec. Indian Mus;* **40(2)**: 176, 1938 (Rajmahal hills). Nazir Ahmad, *Bull. Pb. Univ. Dept. Zool;* **1**: 270, fig.6, 1943 (description, Ravi river, Lahore). Chauhan, *Rec. Indian Mus;* **45(2&3)**: 276, 1947 (Tel river, Belgaon, Patna State). Menon, *Proc. nat. Inst. Sci. India*, **18(16)** : 484, 1950 (Mahanadi river, Eastern Ghats). Chauhan and Ramakrishna, *Rec. Indian Mus;* **51**: 408, 1953 (Kudal Darh of the Tel river at Belgaon, Orissa). Ranade, *J. Bombay nat. Hist. Soc;* **51**: 473, 1953 (freshwaters of Baroda). Job, David and Das, *Indian J. Fish;* **2(1)**: 33, 1955 (frequent in Mahanadi river near Hirakud dam). Sehgal, *J. Bombay nat. Hist. Soc;* **51(1)**: 720, 955 (Mangaldai and Tangla, Assam). Motwani and David, *J. zool. Soc. India*, **9(1)**: 11, 1957 (Sone river, Bihar). Misra, *Rec. Indian Mus;* **57**: 162, 1959 (brief description, distribution and remarks). Menon, *J. zool. soc. India*, **14(2)**: 27, 1962 (Brahmaputra, Bagmati and Gandak drainages; Rapti, Karnali and Kali drainages). Motwani, Jayaram and Sehgal, *Trop. Ecol;* **3(1&2)**: 20, 1962 (River Brahmaputra, Assam). David *Proc. nat. Acad. Sci. India*, **33B(2)** : 278, 1963 (Lower reaches of Krishna and Godavari rivers). Bhuiyan, *Fish. Dacca*, : 24, fig; 1964 (synonymy, description and feeding habits), Srivastava, *Fish. East. U.P.;* : 43, 1968 (Gorakhpur). Datta and Majumdar, *Rec. Zool. surv. India*, **62(1&2)**: 88, pl.9, fig.2, 1970 (Rajasthan). Mirza, *Biologia*, **16(2)**: 78, 1970 (River Ravi, Lahore). Sen, Dasgupta and Rama Rao, *Seafd. Expt. J;* **2(1)**: 3, 1970 (Bengali and Hindi names only, Calcutta). Venkateswarlu and Rama Rao, *Seafd. Expt. J;* **5(6)**: 3, 1973 (Hindi and Bengali names for Gangetic fishes). Mirza and Ahmad, *Biologia*, **20(1)**: 100, 1974 (Name only, Di-khan District, NWFP, Pakistan). Menon, *Inl. Fish. Soc. India spl. Publ;* **(1)**: 32, 1974 (name only, checklist of fishes of the Himlayan and Indo-Gangetic Plain). Ataur Rahman, *Bangladesh J. Sci. Ind. Res;* **9(3&4)**: 200, 1974 (name only, checklist of Bangladesh fishes, Bengali names). Mirza, *Biologia* **20(2)**: 78, 1974 (name only, distribution as Indus Plain, Pakistan). Ataur

Rahman, *Bull, f. w. Fish. Res. Sta;* (1): 7, 1975 (names only, checklist of Bangladesh fishes, Bengali names). Bashir and Mirza, *Bull. Hydrobiol. Res. Gord. College,* **9(1)**: 94, 1975 (River Sutlej Gunda-Singwala, Pakistan). Mirza, *Birjdr. Dierk;* **45(2)**: 172, 1975 (distribution in Pakistan, Indus Plain only). Mirza, *Biologia,* 22(1), 116, 1976 (name only, list of fishes from Northern Montane and Submontane regions of Pakistan with common name). Srivastava and Venkateswarlu, *Indian. J. zool;* **17(3)**: 180, 1976 (name only, list of fishes from U.P. with local names). Venkateswarlu, *Acta Ichthyol. Piscat;* **6(1)**: 90, 1976 (Patna State, Bihar). Yazdani, *Newsl. zool. Surv. India,* **2(2)**: 54, 1976 (Kaziranga wild life sanctuary). Datta, *Newsl. zool. Surv. India* **3(2)**: 25, 1977 (Tripura). Pillai and Yazdani, *Rec. zool. Surv. India,* **72**: 11, 1977 (Someswari river at Bhagmara, Garo hills, Meghalaya). Sen, *Seafd. Expt. J;* **10(1)**: 3, 1978 (name only, Assam, scientific, local and English names). Venkateswarlu and Menon, *Acta Icthyol. Piscat;* **9(1)**: 51, 1979 (checklist of fishes of Ganges). Johal and Tandon, *Pb. Fish. Bull;* **3(2)**: 8, 1979 (synonymy, brief description, East Punjab). Srivastava, *Fish. U.P. Bihar,* : 50, fig.34, 1980 (description, Ramgarh Tal). Mirza, *Proc. Ist Pakistan Congr. Zool;* : 12, 1980 (name only, distribution in Pakistan and elsewhere, original names and Day's equivalent given). Shrestha, *Fish. Nepal,* : 74, 1981 (Kosi and Narayani river zones of Nepal). Coad, *Nat. Mus. Natur. Sci; (Zool);* **(14)**: 1981 (Kabul river, Afghanistan). Jayaram, *HBk. Fw. Fish. India,* : 118, 1981 (key to species). Mirza, *Fish. Lahore,* : 8, fig., 1982 (brief description and distribution). Qureshi and Qureshi, *Indian Fish;* : 63, fig.44, 1983 (local names and description). Lone, *Inland Fish. Aquacult. Pakistan,* : 42, 1983 (name only, distribution in Pakistan and elsewhere). Lipton, *Matsya,* **9-10**: 113, 1983-84 (Manu and Gumti rivers of Tripura). Venkateswarlu, *Rec. zool. Surv. India Occ. Pap;* **(56)**: 34, 1984 (name only, vernacular nams). Husain and Tilak, *Rec. zool. Surv. India,* **81(3&4)**: 274, 1984 (name only, with local name of fishes of Meghalaya). Sen, *Rec. zool. Surv. India Occ. Pap;* **(65)**: 73, fig.34, 1985 (diagnostic characters, Assam). Venkateswarlu and Rama Rao, *Rec. zool. Surv. India Occ. Pap;* **(87)**: 11, 1986 (correct names for Day's fishes). Sharma and Rajput, *J. Bombay nat. Hist. Soc;* **83(3)** (1986): 565, 1987 (name only, fish of Bijnor District of U.P.). Barman, *Rec. zool. Surv. India,* **(119)**: 34, fig.2A & 2B, 1988 (no specimens obtained, record of Lipton's 1984 quoted). Mirza and Abubakr, *Biologia,* **34(1)**: 45, 1988 (name only, Chashma Lake, Mianwal District, Pakistan). Talwar and Jhingran, *Inland Fish;* **1**: 210, 1991 (distinguishing characters and distribution).

Vernacular Names : *Bahtoor, Courie, Kurhi, Kuria* : ASSAME ; *Goni, Kurchi* : BENGALI; *Kurcha* : GUJARATI ; *Bata, Chursua, Kursha, Kursi* : HINDI ; *Kursa* : NEPALI ; *Bichhili, Chursua, Kursha* : ORIYA ; *Sirheen, Siriha* : PUNJABI ; *Mosu* : TELUGU

Specimens studied : Total 11 examples, 75.5 - 276.0 mm in SL.

(1) ZSI F 1326 one example, 167.0 mm in SL; Dibrugarh, Assam. F. Day.

(2) ZSI F 10901 two examples, 236.0 - 276.0 mm in SL ; Southern end of Indawgyi, and along its Western shore, Lonton village, Myitkyina District, Upper Burma.

(3) ZSI F 7710 one example, 75.5 mm in SL; Bhagmathi river, Champaran District, Bihar. Mackenzie, June - October, 1910.

(4) ZSI F 12773 four examples, 102.0 - 111.0 mm in SL ; Sakrigali ghat, Santhal Parganas, Bihar. Rao and Haffiz; February 1938.

(5) ZSI F 2656 one example, 123.0 mm in SL ; Mangaldai, Darrang district, Assam. SL. Hora, 15th 16th November 1939.

(6) ZSI F 902 one example, 126.5 mm in SL ; Fatehsagar Lake, Udaipur District, Rajasthan. R.N. Bhargava, 11th March 1961.

(7) ZSI F 4145 one example, 86.0 mm in SL ; Khandia tank, 2.5 km South of Ghalarpatan, Rajasthan. N. Majumdar and R.N. Bhargava, 8th June 1963.

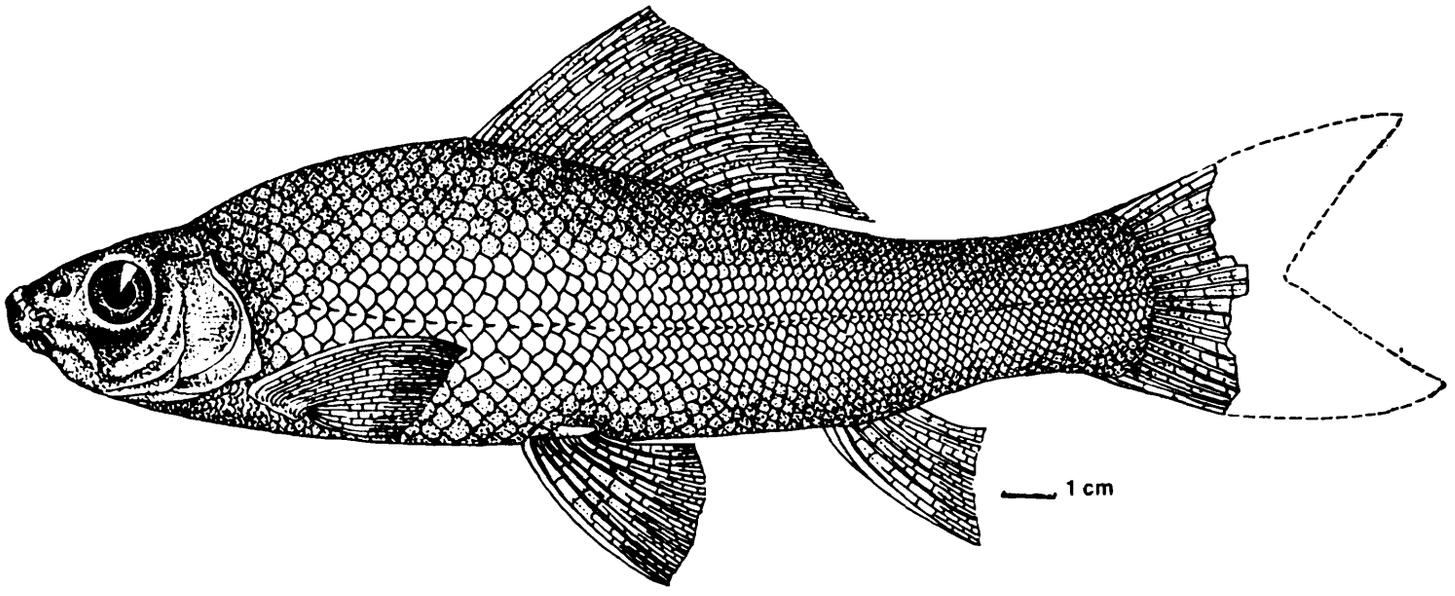

Fig. 2. *Labeo gonius* (Hamilton)

Diagnosis : A *Labeo* with 16 to 18 (ii, 14-16) dorsal fin rays and 65-80 scales on lateral line. Scales are small. Preanal scales 44-57.

Description : D. ii, 14-16; P. i, 14-15; V. i, 8;
A. ii, 5; C. 10 + 9; Ll. 65-80.

Dorsal profile gently arched, body depth 33.0 (27.9-38.0), head length 25.4 (22.8-28.0) in percent of standard length. Head small, width 61.4 (46.5-76.3), height at occiput 68.6 (57.8-79.4), snout length 34.5 (27.9-41.1), width of gape of mouth 24.7 (17.8-31.6), dorsal fin base 94.0 (79.4-108.7), eye diameter 27.3 (21.9-32.7) in percent of head length. Eye 76.3 (61.3-91.3) in percent of snout length, 51.0 (42.9-59.2) in percent of interorbital width. Snout blunt, rostral fold overlaps the upper lip, with no lateral lobe. Mouth narrow, lips thick and fringed, with a distinct inner fold in their entire circumference. Postlabial groove uninterrupted. Two pairs of barbels, maxillary shorter than rostral.

Dorsal fin inserted much nearer to the tip of snout than base of caudal fin; its upper edge concave. Pelvic fin inserted below the middle of dorsal, does not reach the anal fin. Least depth of caudal peduncle 85.3 (73.5-97.1) in percent of its length. Caudal fin forked.

Distribution : INDIA : Northern India and up to Krishna in the south. AFGHANISTAN : Kabul river. PAKISTAN. NEPAL. BHUTAN. MYANMAR and BANGLADESH.

ADDITIONAL DATA

Table : Non-meristic Characters

Labeo gonius (Hamilton)

	Ratio	Mean	SD	Percentage	Mean	n
	Range			Range		
SL/Body depth	2.6 - 3.6	3.1	0.32	27.9 - 38.0	33.0	11
SL/LH	3.5 - 4.4	3.9	0.26	22.8 - 28.0	25.4	11
SL/Predorsal length	2.0 - 2.5	2.3	0.14	39.5 - 49.5	44.5	11
SL/Preanal length	1.2 - 1.3	1.25	0.04	75.7 84.0	79.9	11
SL/Prepelvic length	1.2 2.0	1.6	0.21	50.0 - 57.8	53.9	11
Snout/Eye	1.1 1.6	1.4	0.16	61.3 - 91.3	76.3	11
Iow/Eye	1.7 2.3	2.0	0.21	42.9 - 59.2	51.0	11
LH/Eye	3.0 4.6	3.9	0.45	21.9 - 32.7	27.3	11
LH/Snout	2.4 3.6	3.1	0.33	27.9 - 41.1	34.5	11
LH/Head width	1.3 2.1	1.7	0.31	46.5 - 76.3	61.4	11
LH/HT. at occpt.	1.3 1.7	1.4	0.12	57.8 - 79.4	68.6	11
LH/Width of mouth	3.2 5.6	4.3	0.69	17.8 - 31.6	24.7	11
LH/LCPD	1.4 - 2.1	1.7	0.20	47.8 - 71.4	59.6	11
LH/HCD	1.7 2.4	2.1	0.22	41.7 58.1	49.9	11
LH/Dorsal fin base	0.9 1.3	1.1	0.11	79.7 108.7	94.0	11
LCPD/HCPD	1.0 - 1.4	1.2	0.09	73.5 - 97.1	85.3	11

Gill rakers : 6-15/38-55

Size : Maximum : 150.0 cm (TL)

Colour : When alive, olive green on the back, becoming dull white on the sides and ventral side. Scales dark in their margins, many having red lunules gving the impression of having faint longitudinal lines.

Scales :

Lateral line scales	: 65 - 80
Predorsal scales	: 20 - 25
Prepelvic scales	: 18 - 23
Preanal scales	: 44 - 57
Dorsal fin/Ll.	: 12 - 14
Pelvic fin/Ll.	: $10^1/_2$ - 13
Anal fin/Ll.	: $8^1/_2$ - 11
Circumpeduncular scales	: 25 - 28

Relationship : This species has close resemblance to *Labeo boggut* (Sykes) and *Labeo dussumieri* (Val.), but differing from them in having large number of lateral line scales 65-80 (vs 50-55 in *L. dussumieri* and 55-65 in *L. boggut*) and dorsal fin rays 16-18 (vs 11-12 in *L. boggut* and 14-17 in *L. dussumieri*). In *L. gonius* it appears that there are faint bluish longtudinal stripes along the lateral line scales, as the scales have red lunules in their margin ; this is also the fact in *L. dussumieri*, but the stripes are conspicuous and 8 or 9 in number above and below the lateral line.

Remarks : Day in his *Fish. India* (1878, p.535) stated that *L. gonius* has 74-84 lateral line scales and 13-14 branched dorsal fin rays. However, our specimens show the range as 65-80 and 14 to 16 respectively. The material examined by us represent the size range 75 or 76 mm in SL. which is representative of the natural size to which this species may grow. It appears that the Ll. scales 65-80, is more characteristic of this species.

Labeo boggut (Sykes)

(Fig. 3)

Chondrostoma boggut Sykes, *Trans. zool. Soc. Lond;* **2**: 359, 1841 (type-locality : Poona waterways, Maharashtra). Bleeker, *Verh. Bat. Gen;* **25**: 25, 1853. Jerdon, *Madras J. Lit. Sci;* **15**: 309, 1849. *Beavan, HBk. Fw. Fish. India,* p.185, 1877 (Deccan, Central India).

Tylognathus striolatus Gunther, *Cat. Fish. Brit. Mus;* **7**: 62, 1868 (type-locality : Poona).

Labeo boggut, Day, *Fish. India,* : 542, pl.128, fig.4 1874 (Bengal, the Punjab, Central provinces, Bombay, the Deccan, Jubbulpore, Cutch, Madras and Poona). Day, *Fauna Brit. Ind. Fish;* **1**: 269, 1889 (Bengal, the Punjab, Central provinces, Bombay, the Deccan, common at Jabbulpore, Cutch and Madras). Jenkins, *Rec. Indian Mus;* **3**: 288, 1909 (Giridih subdivision, Hazaribagh District, West Bengal). Hora, *Rec. Indian Mus;* **39**: 19, 1937 (name only, Cauvery river, Coorg State). Hora and Misra, *J. Bombay. nat. Hist. Soc;* **39(3)**: 504, 505, 511, pl.2 (Darna river, Deolali; Aounda river, west of Beal Lake); 513 (Godavari river east of Nasik city); 517 (Darna river South of Lahavit railway station, East channel below Lake Beale dam); 518. 1937 (Darna river between village Sewnsuri and Beladgon). Hora and Misra, *J. Bombay nat. Hist. Soc;* **40(1)**: 22, pl.3, 1938 (Deolali, Bhil name given). Acharya, *J. Bombay nat. Hist. soc;* **40(4)**: 772, 1938-39 (Sabarmati river and tanks from Ahmadabad, North Gujarat). Hora, *Rec. Indian*

Mus; **42(2)**: 366, 1940 (Sihawo market, Raipur District, Madhya Pradesh). Hora and Misra, *J. Bombay nat. Hist. Soc;* **42**: 366, pl.1, 1941 (name only, Satpura range). Hora, *Rec. Indian Mus;* **44(2)**: 196, 1942 (name only, distribution given as Central and South-West India; record frm Malaya doubted). Hora and Misra, *J. Bombay. nat. Hist. Soc;* **43(2)**: 22, 1942 (name only, Poona, Hindi name and distribution given). Fraser, *J. Bombay nat. Hist. soc;* **43(1)**: 82, 1942 (Fitzgerald bridge, Poona). Mohamood and Rahimullah, *J. Bombay nat. Hist. Soc;* **47**: 109, 1945 (Telugu and common names, Hyderabad State). Setna and Kulkarni, *J. Bombay nat. Hist. Soc;* **46**: 128, 1946 (name only, scientific and local names, Hyderabad). Chauhan, *Rec. Indian Mus;* **45(2&3)**: 270 (Dhubel bundh, Purni bundh and Ang river, Patna State, Orissa); 272 (Bolangir); 273, 1947 (Talpali Katha, Chandanbhati, Orissa). Chacko and Kuriyan, *Proc. Indian Acad. Sci;* **28B(5)**: 168, 1948 (name only, Tungabhadra river). Hora, *J. zool. Soc. India,* **1**: 2 (Rihand river, Uttar Pradesh); 3, 1949 (distribution only). Menon, *Rec. Indian Mus;* **48(1)**: 72, 1950 (Isri river at the foor of Parasnath Hills, Chota-Nagpur, Bihar). Menon, *Proc. nat. Inst. Sci. India,* **18(6)**: 484, 1951 (Mahanadi river, Eastern Ghats). Hora, *J. Bombay nat. Hist. Soc;* **51(1)**: 185, 1952 (name only). Mathur, *Rec. Indian Mus;* **50(1)**: 107 (river Banas); 108, 1952 (range of distribution given as Peninsular India, Central Provinces, Satpura-Vindhyas and Malaya; Malaya doubtful). Job, David and Motwani, *J. Asiat. Soc. Beng;* **18(2)**: 169, 1952 (Barakar, Konar and Damodar rivers). Chauhan and Ramakrishna, *Rec. Indian Mus;* **51**: 407, fig 8, 195 (Ang river, tanks at Balangir, Sukhtel river at Chandanbhatti, tanks at Patnagarh, a stream from Sukhtel river, Kudal Darh of Tel river at Belgaon, Orissa; records from Orissa first reported). Ranade, *J. Bombay nat. Hist. Soc;* **51**: 473, 1953 (name only, scientific and local names; reported from waters of Baroda, Gujarat). David, *J. zool. Soc. India,* **5(2)**: 253, 1953 (name only, Damodar and Mahanadi rivers). Job, David and Das, *Indian J. fish;* **2(1)**: 33, 1955 (frequent in Mahanadi river near Hirakud dam, Orissa). Motwani and David, *J. zool. Soc. India,* **9(1)**: 11, 1957 (earlier record by Hora in 1949 from Rihand river cited). Misra, *Rec. Indian Mus;* **57(4)**: 160, 1959 (brief description, distribution given as freshwaters of East Punjab, Uttar Pradesh, Bihar, West Bengal, Madhya Pradesh, Ahmadabad, Cutch, Bombay, Deccan, Poona, Deolali, Madras; freshwaters of West Punjab, East Pakistan and Malaya; Malaya doubtful). David, *Proc. nat. Acad. Sci. India,* **33B(2)**: 278, 1963 (Godavari and Krishna rivers). Dhawan, *J. Bombay nat. Hist. soc;* **66(1)**: 192, 1969 (Udaipur Lake, Rajasthan). Datta and Majumdar, *Rec. zool. Surv. India,* **62(1&2)**: 81, 1970 (Rajasthan). Das and Nath, *Kashmir Sci;* **8(1&2)**: 3 (rare in Tawi river in Jammu, also in Jaggunath at altitude 1000-1500 ft); 5, 1971 (brief description, absent in Kashmir valley). Venkateswarlu and Rama Rao, *Seafd. Expt. J;* 5(6): 3, 1983 (Hindi and Bengali names for gangetic fishes). Mathew and Yazdani, *Sci. Cult;* **39**: 88, 1973 (name only, Jodhpur district, Rajasthan). Ataur Rahman, *Bangladesh J. Sci. Ind. Res;* **9(3&4)**: 201, 1974 (name only, checklist of Bangladesh fishes, Bengali names). Ataur Rahman, *Bull. Fw. Fish. Res. Sta;* **(1)**: 7, 1975 (name only, checklist of Bangladesh fishes, Bengali names, no specimen seen). Mirza, *Birjdr. Dierk;* **45(2)**: 173, 1975 (distribution in Pakistan, Indus Plain only). Venkateswarlu, *Acta Ichthyol. Piscat;* **7**: 48, 1977 (name only, Poon Pun river, Bihar). Yazdani, *Newsl. zool. Surv. India,* **3(6)**: 380, 1977 (name only, Khandwa, Narbada valley, Madhya Pradesh). Sen, *Seafd. Expt. J;* **10(1)**: 3, 1978 (name only, scientific and English names, distribution given as Assam). Venkateswarlu and Menon, *Acta Ichthyol. Piscat;* **9(1)**: 51, 1979 (checklist of fishes of Ganges). Mirza, *Proc. Ist Pakistan Congr. zool;* p.13, 1980 (name only, distribution in Pakistan and elsewhere, original names and Day's equivalent given). Jayaram, *HBk. Fw. Fish. India,* : 119, 1981 (key to species). Jayaram *et al; Rec. zool. surv. India Occ. Pap;* **(36)**: 69, 1982 (name only, Cauvery river). Lone, *Inland fish. Aquacult. Pakistan.* p.43, 1983 (name only, distribution in Pakistan and

elsewhere). Qureshi and Qureshi, *Indian Fish;* p.60, fig 40, 1983 (local names and description). Venkateswarlu, *Rec. zool. surv. India Occ. Pap;* **(56)**: 33, 1984 (name only, vernacular names). Venkateswarlu and Rama Rao, *Rec. zool. Surv. India Occ. Pap;* **(87)**: 11, 1986 (correct name for Day's fishes). Yazdani, *J. Bombay nat. Hist. Soc;* **87(1)**: 160, 1989 (name only, Ujni Wet land, Maharashtra). Sambasiva Rao and Durve, *Indian J. Fish;* **36(1)**: 48, 1989 (name only, Jaisamand Lake, Rajasthan). Talwar and Jhingran, *Inland fish;* **1**: 201, 1991 (common names, distinguishing characters, geographical distribution given as Pakistan, India : Northern India and upto Cauvery river system and Bangladesh).

Labeo udaipurensis Tilak, *Ann. zool;* **26(15)**: 351, fig.1, 1968 (type-locality : Udaipur, Rajasthan).

Labeo rajasthanicus Datta and Majumdar, *Rec. zool. Surv. India.* **62(1&2)**: 83, pl.8, fig.3, text-fig.2, 1970 (type-locality : Jaisamund Lake, Udaipur District, Rajasthan).

Vernacular Names : *Gauri, Loi* : GUJARATI; *Ghor, Gohrah* : HINDI ; *Kolees, Sandas, Sandasi, Sande* : MARATHI ; *Nunia* : ORIYA, *Nusigadu* : TELUGU

Specimens studied : Total 25 examples, 66.0 - 214.0 mm in SL.

(1) ZSI F 4006 three examples, 111.0-119.0 mm in SL; Jawai river, Erinpura, Jalor District, Rajasthan. N. Majumdar and R.N. Bhargava, 2nd July 1963.

(2) SRS/ZSI F 2324 one example, 98.0 mm in SL ; Mahanadi river, Orissa. T.S.N. Moorthy, 24th February 1982.

(3) SRS/ZSI unregistered one example, 66.0 mm in SL ; River Krishna near Devadurga. K.C. Jayaram and party, 22nd August 1987.

(4) SRS/ZSI unregistered three examples, 72.0-93.0 mm in Sl ; River Tungabhadra at Mantralayam, Kurnool, Andhra Pradesh. K.C. Jayaram and party, 14th December 1987.

(5) SRS/ZSI unregistered one example, 214.0 mm in SL; Fish market at Satara, Maharashtra. K.C. Jayaram and party, 5th May 1988.

(6) SRS/ZSI unregistered one example, 105.0 mm in SL; Fish market at Umbraj, Maharashtra. K.C. Jayaram and party, 11th May 1988.

(7) SRS/ZSI unregistered four examples, 96.0-106.5 mm in SL ; Fish market at Pandarpur, catch from River Bhima, Solapur, Maharashtra. K.C. Jayaram and party, 13th May 1988.

(8) SRS/ZSI unregistered one example, 148.0 mm SL ; River Ghataprabha at BhagalRote, Maharashtra. K.C. Jayaram and party, 20th May 1988.

(9) SRS/ZSI unregistered two examples, 109.0-109.5 mm in SL ; River Krishna below Sunnipenta, Srisailan, Kurnool District, Andhra Pradesh. K.C. Jayaram and party, 3rd June 1988.

(10) SRS/ZSI unregistered four examples, 105.0-147.0 mm in SL, River Nagaleru, a tributary of River Krishna, Guntur district, Andhra Pradesh. K.C. Jayaram and party, 29th June 1989.

(11) SRS/ZSI unregistered one example, 77.0 mm in SL; River Krishna belwo Prakasam Barrage, Vijayawada, Andhra Pradesh. K.C. Jayaram and party, 18th January 1990.

(12) SRS/ZSI unregistered one example, 156.0 mm in SL ; River Krishna at Haripurghat, Sangli district, Maharashtra. K.C. Jayaram and party, 7th March 1990.

(13) SRS/ZSI unregistered one example, 186.0 mm in SL ; Fish market at Wai, Maharashtra. K.C. Jayaram and party, 9th March 1990.

(14) SRS/ZSI unregistered one example, 175.0 mm in SL ; River Tungabadhra, Mantralayam, Andhra Pradesh. K.C. Jayaram and party, 13th March 1990.

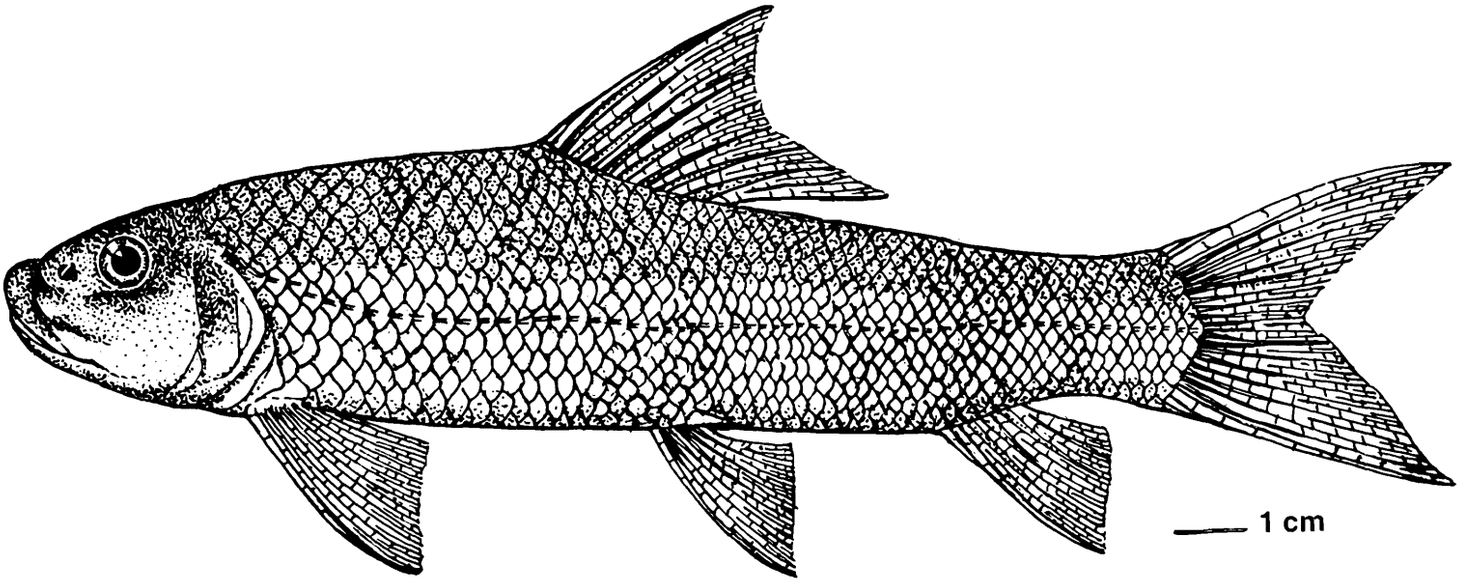

Fig. 3. *Labeo boggut* (Sykes)

Diagnosis : A *Labeo* with 55-65 scales on lateral line. One pair of barbels, maxillary. Dorsal fin with 11 or 12 rays.

Description : D.ii, 9-10; P.i, 14-16; V.i. 8;
A.ii,5; C.10+9; Ll.55-65.

Body elongate and slender, dorsal profile slightly eonvex than ventral, body depth 24.7 (20.0-29.4), head length 25.1 (21.7-28.6) in percent of standard length. Head moderate, width 59.5 (47.6-71.4), height at occiput 69.7 (62.5-76.9), snout length 29.1 (23.8-34.5), width of

gape of mouth 26.2 (16.7-35.7), dorsal fin base 72.9 (62.5-83.3), eye diameter 20.8 (16.7-25.0) in percent of head length. eye 70.0 (50.0-90.9) in percent of snout length, 61.6 (40.0-83.3) in percent of interorbital width. snout with slight depression, projecting beyond mouth, devoid of any lateral lobe, occasionally with few pores; a groove on each side of chin. Mouth cresentic; lips thick, upper smooth, lower slightly fringed with a thin cartilaginous covering to its entire circumference. Postlabial groove interrupted, a depression found beyond the lower lip. barbels hidden in the groove of corner of the mouth.

Dorsal fin inserted slightly posterior to the tip of the pectoral fin, nearer to tip of the snout than to base of caudal fin. Pelvic fin inserted below, the first third or fourth rays of dorsal fin. Pelvic does not reach anal which does not reach caudal which is forked. Least depth of caudal peduncle 78.8 (66.7-90.9) in percent of the length. Lateral line slightly curved below the dorsal fin.

ADDITIONAL DATA

Table : Non-meristic Characters

Labeo boggut (Sykes)

	Ratio	Mean	SD	Percentage	Mean	n
	Range			Range		
SL/Body depth	3.4 5.0	4.0	0.41	20.0 - 29.4	24.7	25
SL/LH	3.5 - 4.6	4.1	0.32	21.7 - 28.6	25.1	25
SL/Predorsal length	1.9 - 2.3	2.1	0.07	43.5 - 52.6	48.0	25
SL/Preanal length	1.0 - 1.3	1.2	0.06	76.9 - 100.0	88.4	25
SL/Prepelvic length	1.8 - 2.0	1.9	0.20	50.0 - 55.5	52.7	25
Snout/Eye	1.1 - 2.0	1.4	0.25	50.0 - 90.9	70.0	25
Iow/Eye	1.2 2.5	1.7	0.32	40.0 - 83.3	61.6	25
LH/Eye	4.0 6.0	4.9	0.68	16.7 - 25.0	20.8	25
LH/Snout	2.9 - 4.2	3.5	0.41	23.8 - 34.5	29.1	25
LH/Head width	1.4 2.1	1.8	0.18	47.6 - 71.4	59.5	25
LH/HT. at occpt.	1.3 - 1.6	1.4	0.09	62.5 - 76.9	69.7	25
LH/Width of mouth	2.8 6.0	4.0	0.77	16.7 - 35.7	26.2	25
LH/LCPD	1.3 2.0	1.6	0.18	50.0 - 76.9	63.4	25
LH/HCD	1.8 2.6	2.1	0.21	38.5 - 55.5	47.0	25
LH/Dorsal fin base	1.2 1.6	1.4	0.11	62.5 - 83.3	72.9	25
LCPD/HCPD	1.1 1.5	1.3	0.11	66.7 - 90.9	78.8	25

Distribution : INDIA : Throughout except Kerala. PAKISTAN and BANGLADESH.

Gill Rakers : 6-10/25-29

Size : Maximum : 22.0 cm (SL).

Scales :

Lateral line scales	: 55-65
Predorsal scales	: 19-22
Prepelvic scales	: 18-24
Preanal scales	: 35-39
Dorsal fin/Ll.	: $10^{1}/_{2}$-$12^{1}/_{2}$
Pelvic fin/Ll.	: $8^{1}/_{2}$-9
Anal fn/Ll.	: $8^{1}/_{2}$-$9^{1}/_{2}$
Circumpeduncular scales	: 26-32

Colour : When alive, body dark above, becomes silvery towards the belly; often few light longitudinal lines or a bluish band along the body. A dark diffused blotch usually near the base of caudal fin, and another small one on the shoulder, fins are tinged with orange. When preserved, the dorsal side of the body exhibits dark brown which becomes light brown towards the belly. Often a dark brown spot on the operculum. Fins light brown.

Relationship : Related to *L. dussumieri* (Valenciennes). In *Labeo boggut*, mouth is cresentic and lower lip alone is with cartilaginous covering, but in *L. dussumieri* mouth is narrow and both lips are with cartilaginous covering. One pair of maxillary barbels in *Labeo boggut*; two pairs in *L. dussumeri*. They also differ in scale counts; lateral line scales 55-65 in *L. boggut* (vs 50-55 in *L. dussumieri*). Dorsal fin with ii, 9-10 rays (vs ii or iii, 12-14 in *L. dussumieri*). SL/preanal length 76.9-100.0 (vs 74.6-88.3 in *L. dussumieri*).

Remarks : While describing the genus *Tylognathus* Gunthur (1868) mentioned that "it cannot be denied that the separation of this genus from *Labeo* Cuvier is artificial" and separated the two genera based on the dorsal fin count and some differences in the skeleton. The range of dorsal fin ray counts in *L. boggut* overlaps that of *T. striolatus*, the type species of *Tylognathus* and hence the latter is synonymised. It is worth noting that both species are from Poona.

Tilak (1968) described *L. udaipurensis* from Udaipur lake, Rajasthan based on a single example. Similarly Datta and Majumdar (1970) described *L. rajasthanicus* from Jaisamund Lake, Rajasthan based on one specimen. The so called differentiating major characters of these species fall within the range of variation of *L. boggut* and as such they are considered synonyms. The variations noted may be due to their lentic habitat. Further records of these species are also not known which confirms our contention that they are not separate species.

Labeo dussumieri (Valenciennes)

(Fig. 4)

Rohita dussumieri Valenciennes (in Cuvier and Valenciennes), *Hist. nat. Poiss;* **16**: 258, pl.475, 1842 (type-locality: Alleppy, Kerala). Day, *Fish. Malabar,* : 207, 1865 (Rivers of Malabar; common in Kuriavanoor river near Cochin).

Rohita rouxii Valenciennes (in Cuvier and Valenciennes), *Hist. nat. Poiss;* **16**: 270, 1842.

Cirrhinus dussumieri, Jerdon, *Madras J. Lit. Sci ;* **15**: 304, 1849.

Cirrhinus rouxii, Jerdon, *Madras J. Lit. Sci;* **15**: 304, 1849.

Labeo rouxii, Gunther, *Cat. Fish. Brit. Mus ;* **7**: 55, 1868 (Bombay).

Labeo dussumieri, Gunther, *Cat. Fish. Brit. Mus ;* **7**: 59, 1868 (Peninsula of India and Ceylon). Beavan, *HBk. Fw. Fish. India.* : 63, 1877 (India and Ceylon). Day, *Fish. India,* : 538, pl.126, fig.5, 1877 (rivers of South Malabar, Ceylon and perhaps Bombay). Day, *Fauna Brit. Ind. Fish;* **1**: 262, 1889 (Rivers of South Malabar, Ceylon and Bombay; Bombay doubtful). Hora, *J. Asiat. Soc. Beng;* **22(3)**: 97, 1927 (fish drawings in the Mackenzie's collection, Tungabhadra river). Hora, *Rec. Indian. Mus;* **31**: 193, 1929 (name only). Pillay, *J. Bombay nat. Hist. Soc;* **33(2)**: 357, 1929 (name only, local name, Alleppey). Deraniyagala, *Spolia Zeylanica,* **16(1)**: 8, 1930 (local name, description, Sri Lanka). John, *J. Bombay nat. Hist. Soc;* **38(4)**: 706, 710, 1936 (name only, local name, common in deep rivers of Travancore; specimens often seen in the fish markets of Alleppey, Changanachery and Quilon). Hora, *Rec. Indian Mus*; **39(1)**: 19, 1937 (name only, Cauvery river, Coorg State). Hora, *Rec. Indian Mus*; **43(2)**: 241, 1941 (name only, description given as common in Peninsular India and Sri Lanka). Hora, *Rec. Indian Mus;* **44(2)**: 196, 1942 (name only, description given as Sri Lanka, South Malabar and Mysore). Herre, *Spolia Zeylanica,* **24(3)**: 175, 1946 (name only, Galatabendiyaya, Sri Lanka). Silas, *Bull. nat. Inst. Sci. India,* **7**: 251, 1952 (name only, distribution as Sri Lanka). Deraniyagala, *Col. Atlas Verte. Ceylon,* **1**: 41, 1952 (Sri Lanka). David, *Proc. nat. Inst. Sci. India,* **22(13)**: 166, 1956 (Bhadra river at Bhadra in Karnataka, occurrence in polluted water, stomach content). David, *Proc. nat. Acad. Sci. India,* **33B(2)**: 278, 1963 (quoted as recorded in the Tungabhadra by David in 1957). Johal and Tandon, *Pb. Fish. Bull;* **3(2)**: 9, 1979 (synonymy, brief description, East Punjab; East Punjab doubtful). Jayaram, *HBk. Fw. Fish. India,* : 118, 1981 (distribution given as Western Ghats up to North Canara, Sri Lanka). Jayaram *et al; Rec. zool. Surv. India Occ. Pap;* **(36)**: 69, 1982 (quoted as recorded by Hora in 1937 from Cauvery, Mysore). Munro, *Marine Fw. Fish. Ceylon,* : 46, 1982 (Sri Lanka). Venkateswarlu, *Rec. Zool. Surv. India Occ. Pap;* **(56)**: 34, 1984 (name only, vernacular names). Venkataeswarlu and Rama Rao, *Rec. zool. Surv. India Occ. Pap;* **(87)**: 11, 1986 (correct name for Days's fishes). Talwar and Jhingran, *Inland Fish*; **1**: 206, 1991 (Western Ghats up to North Canara and probably Sri Lanka). Pethiyagoda, 1991, *Fw Fishes of Sri Lanka,* : 82, 83 (photo : Sri Lanka).

Vernacular Names : *Toulee* : MALAYAM, *Gankanaya, Hirikanya* : SINHALESE

Specimens studied : Total six examples, 68.0 214.5 mm in SL.

(1) ZSI F 1132 one example, 155.0 mm in SL; Malabar. F. Day.

(2) ZSI F 2743 one example, 147.5 mm in SL; Malabar. F. Day.

(3) ZSI 12020 one example, 185.5 mm in SL; J.J. Asana.

(4) ZSI F 4709 two examples, 68.0 - 86.00 mm in SL; Zoological Survey of India party, 6th 15th May 1954.

(5) ZSI/SRS unregistered one example, 214.5 mm in SL; Karuvanurphuza, 15 km east of Trichur, Kerala. A.G.K. Menon, 1992.

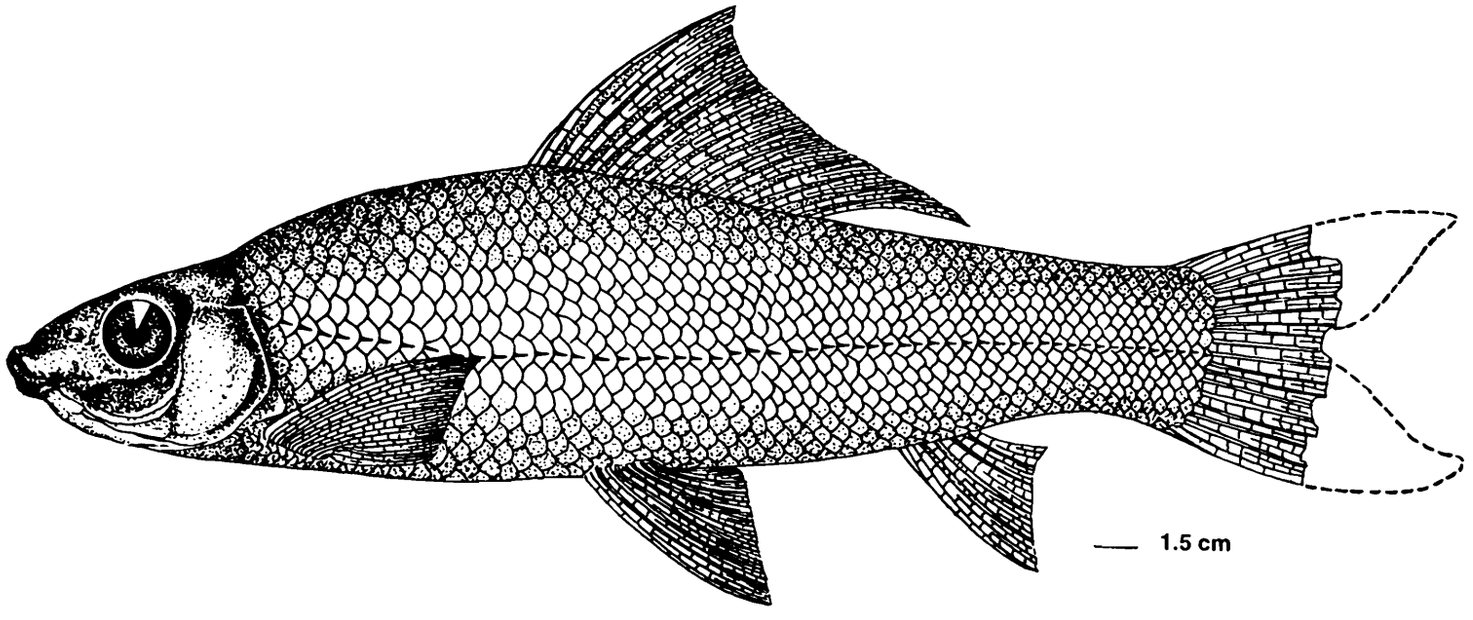

Fig. 4. *Labeo dussumieri* (Valenciennes).

Diagnosis : A *Labeo* with 50-55 lateral line scales; dorsal fin with 15 or 16 rays; prepelvic scales 14 to 16.

Description : D.ii or iii, 12-14; P. i, 16 or 17; V. i. 8;
A. ii, 5; C. 10+9; Ll. 50-55

Body oblong, and compressed, its depth 25.9 (22.4-29.4), head length 26.6 (22.4-30.9) in percent of standard length. head moderate, width 58.4 (52.3-64.5), height at occiput 70.7 (62.1-79.3), snout length 31.7 (28.0-35.5), width of gape of mouth 30.7 (23.5-38.0), dorsal fin base 82.1 (62.1-102.0), eye diameter 25.1 (20.8-29.4), in percent of head length. Eye 79.4 (58.8-100.0) in percent of snout length, 56.5 (41.7-71.4) in percent of interorbital width, Snout

slightly projecting beyond mouth, without any lateral lobe, numerous pores sometimes on the snout extending posteriorly as far as orbit and below the nostrils. Mouth narrow, inferior, lips fleshy and fringed with distinct inner fold above and below; postlabial groove continuous without interruption. Four barbels, maxillary longer than rostral.

Dorsal fin inserted midway between the tip of the snout and base of caudal fin; it is slightly in advance of the pevic fin. Upper edge of dorsal fin concave. Least depth of caudal peduncle 73.4 (64.9-82.0) in percent of its length. Caudal fin forked. Lateral line straight.

Distribution : INDIA : Western face of Western Ghats and North Canara. SRI LANKA.

ADDITIONAL DATA

Table : Non-meristic Characters

Labeo dussumieri (Valenciennes)

	Ratio	Mean	SD	Percentage	Mean	n
	Range			Range		
SL/Body depth	3.4 4.5	4.0	0.36	22.4 - 29.4	25.9	6
SL/LH	3.2 4.5	3.9	0.46	22.4 - 30.9	26.6	6
SL/Predorsal length	2.0 2.3	2.2	0.12	42.9 - 50.0	46.5	6
SL/Preanal length	1.2 1.3	1.25	0.05	74.6 - 83.3	79.0	6
SL/Prepelvic length	1.8 - 2.1	1.9	0.12	47.2 - 56.2	51.7	6
Snout/Eye	1.0 1.7	1.3	0.25	58.8 - 100.0	79.4	6
Iow/Eye	1.4 - 2.4	1.8	0.35	41.7 - 71.4	56.5	6
LH/Eye	3.4 4.8	4.1	0.51	20.8 - 29.4	25.1	6
LH/Snout	2.8 - 3.6	3.0	0.52	28.0 - 35.5	31.7	6
LH/Head width	1.5 1.9	1.7	1.13	52.3 - 64.5	58.4	6
LH/HT. at occpt.	1.3 1.6	1.4	0.12	62.1 - 79.3	70.7	6
LH/Width of mouth	2.7 4.2	3.7	0.53	23.5 - 38.0	30.7	6
LH/LCPD	1.3 2.1	1.6	0.34	47.1 - 76.3	61.7	6
LH/HCD	1.8 3.0	2.1	0.40	33.3 - 56.2	44.7	6
LH/Dorsal fin base	1.0 1.6	1.2	0.24	62.1 - 102.0	82.1	6
LCPD/HCPD	1.2 1.5	1.4	0.12	64.9 - 82.0	73.4	6

Gill rakers : 18-19/52-54

Size : Maximum : 33.0 cm (SL)

Scales :

Lateral lin scales	: 50-55
Predorsal scales	: 16-17
Prepelvic scales	: 14-16
Preanal scales	: 30-34
Dorsal fin/Ll.	$8^1/_2$-$9^1/_2$
Pelvic fin/Ll.	$5^1/_2$-$6^1/_2$
Anal fin/Ll.	: $5^1/_2$-$6^1/_2$
Circumpeduncular scales	: 21-23

Colour : When alive, this fish exhibits olive green on the dorsal side, which gradually becomes silvery towards belly. Dorsal fin tinged with red. Parallel to lateral line 8-9 brownish stripes passing from shoulder to the tip of caudal pedunele. Scales with reddish centre, edged with dark shades. a dull diffused dark blotch on either side of the tail.

Relationship : This species is related to the widely occuring *Labeo boggut* (Sykes) and North Indian species *L. gonius* in its form. But it differs from these two in having moderate number of lateral line scales 50-55 (vs. 55-65 and 65-80) and of dorsal fin rays 14-17 (vs 11-12 and 16-18).

Remarks : This species is endemic to Western Ghats, especially its western face. Day (1878, p.538) stated that its habitat as 'Rivers of south Malabar, Ceylon and perhaps Bombay' Acharya (1938-39) in his report on fishes from North Gujarat, mentioned its name only and it may be a misidentification. Hora and Law (1941) stated that its range of distribution as Ceylon, Peninsular India and Gujarat. However, Hora (1942) restricted its distribution to Ceylon, south Malabar and Mysore. Setna and Kulkarni (1946) reported it from Ahmedabad ; this is also doubtful as no specimen has been since reported. Johal and Tandon (1979)'s report from East Punjab is also viewed with doubt for the same reason. Jayaram *et al* (1982) citing Hora's (1937) report, stated that they didn't obtain any specimen from Cauvery. Hence, it would be worth to limiting its range of distribution as Western Ghats, Kerala and Sri Lanka.

Group - II
THE *PANGUSIA* GROUP

This group comprises the following species :

1. *Labeo pangusia* (Hamilton, 1822, p.285)
2. *Labeo angra* (Hamilton, 1822, p.331)
3. *Labeo fisheri* Jordan and Starks, 1917, p.436

Common characters of these species are below :

1. Snout without any depression, studded with pores, fleshy lateral lobe
2. Lips thick, fringed

3. Postlabial groove uninterrupted, sometimes with a fleshy-flap over it
4. A pair of small flap-like or definite maxillary barbels hidden in the labial groove (in *L. fisheri*, at times a pair of rudimentary rostral barbels)
5. Dorsal fin with ii, 9-12 rays
6. Lateral line scales 40-42
7. When alive upper half always olive green

The following is a comparative table of differences between the three species of the group :-

	Dorsal fin	Ll. scales	Predorsal scales	Prepelvic scales	Preanal scales	Dorsal fin/Ll.	Pelvic fin/Ll.	Anal fin/Ll.	Circum-peduncular scales
Labeo pangusia (Hamilton)	ii-iii, 9-12	40-42	11-14	9-13	23-25	$7^1/_2$-$8^1/_2$	$5^1/_2$-$6^1/_2$	$5^1/_2$-$6^1/_2$	20-24
Labeo angra (Hamilton)	ii, 10-11	40	12-14	9-12	23-26	7-$8^1/_2$	$5^1/_2$-$6^1/_2$	6-7	20-22
Labeo fisheri Jordan & Starks	ii-iii, 10-12	40-42	16-18	13	30-35	$7^1/_2$	$5^1/_2$	6	20

Labeo pangusia (Hamilton)

(Fig. 5)

Cyprinus pangusia Hamilton, *Fish, Ganges,* : 285, 386 1822 (type-locality : River Kosi). Cuvier and Valenciennes, *Hist. nat. Poiss;* **16**: 429, 1842.

Gobio pangusia, McClelland, *Asiat. Res;* **19**: 279, 362, pl.42, fig.1 (from Hamilton's Ms drawings) 1839.

Labeo pangusia Gunther, *Cat. Fish. Brit. Mus;* **7**: 58, 1868 (River Kosi; Cachar, River Song). Beavan, *HBk. Fw. Fish. India,* : 65, 1877 (Bengal and Cachar). Day, *Fish. India,* : 541, pl.131, fig.1, 1877 (Himalayan range and generally through Sind, the Deccan, N.W. provinces to Bengal, Cachar and Assam). Day, *Fauna Brit. Ind. Fish;* **1**: 266, 1889 (Himalayan range, Sind, Deccan, N.W.Provinces, Bengal, Cachar and Assam). Jenkins, *Rec. Indian Mus;* **3**: 288, 1909 (Giridih sub-division of Hazaribagh District, West Bengal). Chaudhuri, *Rec. Indian Mus;* **6**: 15, 1911 (name only, Rihand river, Mirzapur District, Uttar Pradesh). Menon, *Rec. Indian Mus;* **52**: 22, 1954 (Manipur). Motwani, Jayaram and Sehgal, *Trop. Ecol;* **3(1&2)**: 20, 1962 (River Brahmaputra, Assam). Menon, *J. zool. Soc. India,* **14(7)**: 27, 1962 (Chindwin and Brahmaputra drainages). David, *Proc. nat. Acad. Sci. India,* **33B(2)**: 278, 1963 (Godavari; report from the Tungabhadra cited). Das and Nath, *Kashmir Sci;* **8(1&2)**: 3, 6, 1971 (common in Tawi in Jammu and also in Jajja-Nallah 1000-1500 ft alt; brief description). Venkateswarlu and Rama Rao, *Seafd. expt. J;* **5(6)**: 3, 1973 (Hindi and Bengali names of Gangetic fishes). Menon, *Inl. fish. soc. India Spl. Publ;* **(1)**: 33, 1974 (checklist of fishes of the Himalayan and Indo-Gangetic Plains, *L. angra* and *L. dyocheilus* synonymised with *L. pangusia*). Ataur Rahman, *Bangladesh J. Sci. Ind. Res;* **9(3&4)**: 200, 1974 (name only, checklist of fishes of Bangladesh with Bengali names). Ataur Rahman, *Bull. Fw. Fish. Res. Sta;* **(1)**: 7, 1975 (name only, checklist of Bangladesh fishes with Bengali names). Mirza, *Bijdr. dierk;* **45(2)**: 172, 1975 (distribution in Pakistan). Venkateswarlu, *Acta Icthyol. Piscat;* **6(1)**: 90, 1976 (name only, Patna

District, Bihar). Pillai and Yazdani, *Rec. zool. Surv. India,* **72**: 11, 1977 (Someswari river at Bhagmara, Garo hills at Meghalaya). Venkateswarlu, *Acta Ichthyol. Piscat;* **7**: 48, 1977 (name only, Poonpun river, Bihar). Sen *Seafd. Expt. J;* **10(1)**: 3, 1978 (name only, Assam; scientific, local and English names). Venkateswarlu and Menon, *Acta Ichthyol. Piscat;* **9(1)**: 51, 1979 (checklist of fishes of Ganges). Johal and Tandon, *Pb. fish. Bull;* **3(2)**: 10, 1979 (synonymy, description, East Punjab). Khan and Kamal, *J. Bombay nat. Hist. Soc;* **76(3)**: 532, 1979 (Kosi river, Bihar). Mirza, *Proc. Ist Pakistan Congr. Zool;* : 12, 1980 (name only, distribution in Pakistan and elsewhere; original names and Day's equivalent given). Srivastava, *Fish. U.P. Bihar,* : 51, fig.36, 1980 (description, Gandak river). Shrestha, *Fish Nepal,* : 76, fig.36, 1981 (Bheri, Kosi, Lumbini and Sagarmatha zones in Nepal and elsewhere). Jayaram, *HBk. Fw. Fish. India,* : 119, 1981 (key to species). Jayaram *et al; Rec. zool. surv. India Occ. Pap* **(36)**: 70, 1982 (Cauvery examples with deep groove on snout recorded). Qureshi and Qureshi, *Indian fish;* : 64, fig.44, 1983 (local names, description). Lone, *Inland fish. Aquacult. Pakistan,* : 42, 1983 (name only, distribution in Pakistan and elsewhere). Venkateswarlu, *Rec. zool. surv. India Occ. Pap.* **(56)**: 35, 1984 (name only, vernacular names). Sen, *Rec. zool. Surv. India Occ. Pap.* **(65)**: 75, 1985 (diagnostic characters). Vishwanath Singh and Tombi Singh, *Instt. J. Acad. Ichthyol. Proc. v. AISI;* **6**: 86, 1985 (Chakpi stream, Tengnopaul District, Manipur). Venkateswarlu and Rama Rao, *Rec. zool. Surv. India Occ. Pap;* **(87)**: 11, 1986 (correct name for Day's fishes). Sharma and Rajput, *J. Bombay nat. Hist. Soc;* **83(3)**: 565, 1987 (name only, local, scientific names and seasonal availability in Bijnor District of Uttar Pradesh). Talwar and Jhingran, *Inland Fish;* **1**: 216, fig.77, 1991 (geographical distribution given as Ganga, Brahmaputra drainage systems of Himalaya in India, Pakistan and Bangladesh).

Vernacular Names : *Lasu* : ASSAME.; *Loannee, Utti* : BENGALI ; *Boalla, Loanee, Rewa*: HINDI, *Akhrot, Bhangan* : PUNJABI

Specimens studied : Total 23 examples, 48.0-152.0 mm in SL.

(1) SRS/ZSI unregistered three examples, 60.5-71.0 mm in SL; Eluru canal, Vijayawada, Krishna District, Andhra Pradesh. T. Venkateswarlu, 31st October 1973.

(2) SRS/ZSI unregistered two examples, 48.0-49.0 mm in SL; Penna Badvel, Cuddaph District, Andhra Pradesh. T. Venkateswarlu, 22nd March 1983.

(3) SRS/ZSI unregistered one example, 65.0 mm in SL; Moyar river, near Moyar Power House, Mudumalai, Nilgiri District, Tamil Nadu. Vasanth and party, 24th February 1988.

(4) SRS/ZSI unregistered three examples, 122.0-152.0 mm in SL; Grand Anicut, river Cauvery at Trichy, Trichy district, Tamil Nadu. K.R. Rao and party, 3rd May 1989.

(5) SRS/ZSI unregistered one example, 124.0 mm in SL; fish market at Trichy, Trichy District, Tamil Nadu. K.R. Rao and party, 4th May 1989.

(6) SRS/ZSI unregistered eight examples, 83.0-107.0 mm in SL; River Krishna below Prakasam barrage at Vijayawada, Andhra Pradesh. K.C. Jayaram and party, 2nd July 1981.

(7) SRS/ZSI unregistered two examples, 110.0-111.0 mm in SL; Madras or Western Main Canal at Sitanagram, Vijayawada, Andhra Pradesh. K.C. Jayaram and party, 17th January 1990.

(8) SRS/ZSI unregistered one example. 93.0 mm in SL; River Krishna below Prakasam barrage, Vijayawada, Andhra Pradesh. K.C. Jayaram and party, 18th January 1990.

(9) SRS/ZSI unregistered two examples, 75.0-93.0 mm SL. Elura canal at Vijayawadapuram, Vijayawada, Andhra Pradesh. K.C. Jayaram and party, 18th January 1990.

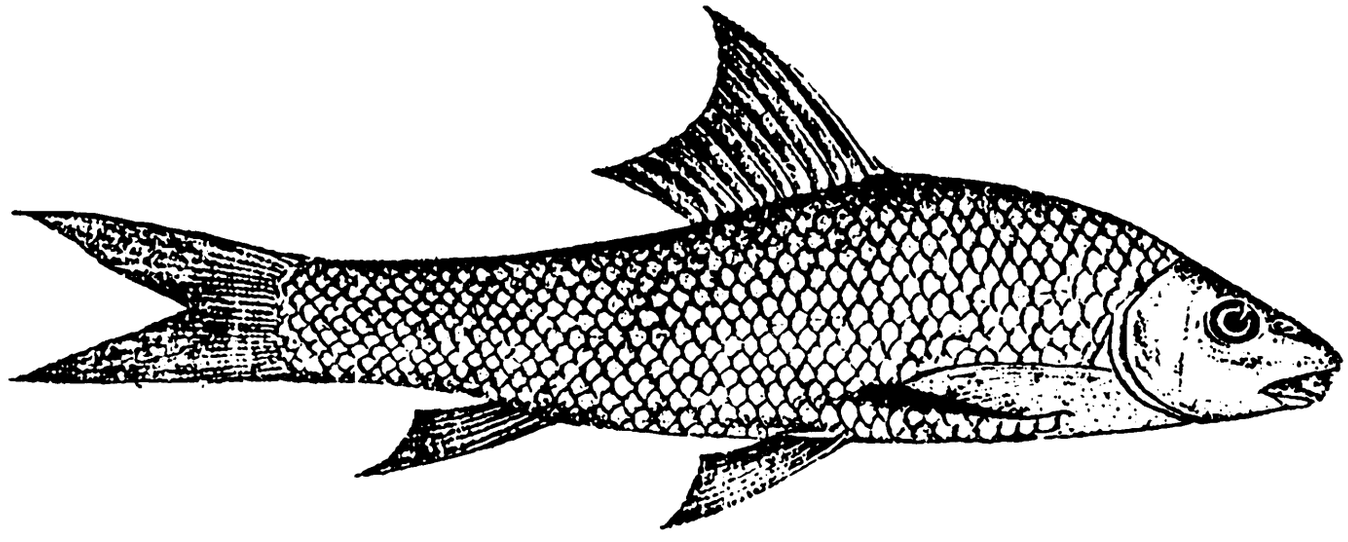

Fig. 5. *Labeo pangusia* (Hamilton)

Diagnosis : A *Labeo* with 11-13 (ii-iii, 9-12) dorsal fin rays. Lateral line scales, 40-42. Snout without a groove but with lateral lobes. Mouth narrow; lips thick, slightly fimbriated. Postlabial groove generally uninterrupted. Sometimes a muscle flap over from isthmus.

Description : D.ii-iii, 9-12; P.i, 14-16; V.i.8;
A.ii, 5; C. 10+9; Ll. 40-42.

Dorsal profile gently arched, body rather compressed, its depth 25.6 (21.7-31.2), head length 27.5 (23.8-31.2) in percent of standard length. Head small, width 58.8 (43.5-90.9), height at occiput 66.7 (62.5-76.9), snout length 34.5 (27.0-47.6), width of gape of mouth 29.4 (23.3-40.0), dorsal fin base 76.9 (62.5-90.5), eye diameter 22.7 (17.2-26.3) in percent of head length. Eye 66.7 (41.7-90.9) in percent of snout length, 62.5 (45.5-90.9) in percent of interorbital width. Snout obtuse, projecting over the jaws and having a indistinct lateral lobe, covered with pores. Mouth narrow. Lips thick, slightly fringed, with a distinct inner fold which is not continued across the lower jaw. A cartilaginous covering to inner surface of both lips. a pair of short maxillary barbels, concealed in the labial fold. Postlabial groove generally uninterrupted.

Dorsal fin inserted nearer tip of snout than the base of caudal fin and it is as high as body; its upper edge concave. Pectoral fin not reaching the pelvic which does not reach the anal. Anal fin reaches the caudal base. Caudal fin deeply forked. Least depth of caudal peduncle 71.4 (58.8-90.9) in percent of its length.

Distribution : INDIA : throughout except Kerala. PAKISTAN, NEPAL and BANGLADESH.

Scales :

Lateral line scales	: 40-42
Predorsal scales	: 11-14
Prepelvic scales	: 9-13
Preanal scales	: 23-25
Dorsal fin/Ll.	: $7^1/_2$-$8^1/_2$
Pelvic fin/Ll.	: $5^1/_2$-$6^1/_2$
Anal fin/Ll.	: $5^1/_2$-$6^1/_2$
Circumpeduncular scales	: 20-24

Gill rakers : 4-8/26-29

Size : Maximum : 60.0 cm (TL)

Colour : Dull green becoming lighter along the ventral side. Each scale often with a dark mark. Dorsal and caudal fins grey. Pelvic and anal fins hyaline, tinged with red.

Relationship : This has close resemblance to *L. angra* (Hamilton). A cursory look at the both species may strike one as identical but close observation reveals both species are distinct. Both have overhanging snout, with lateral lobes and a narrow mouth, but in *L. pangusia* the lateral lobe is indistinct whereas in *L. angra* it is distinct. In *L. pangusia*, the lips are not much fringed but thick; in *L. angra* both lips are fimbriated. In both the postlabial groove separates the lower jaw from isthmus. In *L. angra* a black or bluish stripe which runs from eye to the base of caudal fin, ends as a blotch, whereas this stripe is lacking in *L. pangusia*.

L. pangusia has ii, 9-12 dorsal fin rays (vs ii, 10 or 11 in *L. angra*), lateral line scales 40-42 (vs 42 in *L. angra*). Scales between dorsal fin and lateral line $7^1/_2$-$8^1/_2$ (vs 7-$8^1/_2$ in *L. angra*).

Morphometrically also there are differences in the measurements between *L. pangusia* and *L. angra*. In *L. pangusia* the snout length is 27.0-47.6 in percent of head length (vs 28.5-50.0). LH/Ht. at occiput in *L. pangusia* is 62.5-76.9 (vs 62.5-83.5). LH/LCPD in *L. pangusia* is 40.0-52.6 (vs 55.6-83.3). LH/Dorsal fin base in *L. pangusia* is 62.5-90.9 (vs 62.5-83.3). LCPD/HCPD in *L. pangusia* is 58.8-90.9 (vs 55.6-71.4).

Remarks : Hora (1921) found that specimens from Manipur have a black blotch at the base of the caudal fin. He observed that *L. pangusia* is likely to be confused with *L. angra* but can be distinguished from the latter by the possession of definite barbels instead of maxillary flaps as in *L. angra* and also the presence of a triangular black spot just above the 5th scale of the

lateral line in *L. pangusia*. Our specimens of *L. pangusia* caught from the Krishna river system have a flap-like maxillary, but in respect of other characters they differ from *L. angra*. The flap like maxillary is as such a variable character for which no importance need be given.

Jayaram *et al.* (1982) indicated that larger specimens of their collection from Cauvery river had a deep groove across the snout with many tubercles and pores. None of the specimens from Krishna has any groove or pores.

ADDITIONAL DATA

Table : Non-meristic Characters

Labeo pangusia (Hamilton)

	Ratio	Mean	SD	Percentage	Mean	n
	Range			Range		
SL/Body depth	3.2 4.6	3.9	0.41	21.7 - 31.2	25.6	23
SL/LH	3.2 4.2	3.8	0.21	23.8 - 31.2	27.5	23
SL/Predorsal length	1.9 2.4	2.1	0.11	41.7 - 52.6	47.7	23
SL/Preanal length	1.2 - 1.4	1.3	0.03	71.4 - 83.3	76.9	43
SL/Prepelvic length	1.0 - 2.0	1.9	0.07	50.0 - 55.6	52.6	43
Snout/Eye	1.1 2.4	1.5	0.30	41.7 - 90.9	66.7	43
Iow/Eye	1.1 2.2	1.6	0.28	45.5 - 90.9	62.5	23
LH/Eye	3.8 - 5.8	4.4	0.45	17.2 - 26.3	22.7	23
LH/Snout	2.1 - 3.7	2.9	0.54	27.0 - 47.6	34.5	23
LH/Head width	1.5 - 2.3	1.7	0.18	43.5 - 66.7	58.8	23
LH/HT at occpt.	1.3 1.6	1.5	0.07	62.5 - 76.9	66.7	23
LH/Width of mouth	2.5 - 4.3	3.4	0.44	23.3 - 40.0	29.4	23
LH/LCPD	1.3 - 2.1	1.6	0.18	47.6 - 76.9	62.5	23
LH/HCPD	1.9 - 2.5	2.2	0.15	40.0 - 52.6	45.5	23
LH/Dorsal fin base	1.1 - 1.6	1.3	0.13	62.5 - 90.9	76.9	23
LCPD/HCPD	1.1 1.7	1.4	0.15	58.8 - 90.9	71.4	23

Labeo angra (Hamilton)

(Fig. 6)

Cyprinus angra Hamilton, *Fish. Ganges*, : 331, 391, 1822 (type-locality : Brahmaputra river). Gray, *Ill. Ind. Zool;* **1**: 326, pl.86, fig.1 (from Hamilton's Ms. drawings), 1830-32.

Cyprinus morala Hamilton, *Fish. Gagnes,* : 331, pl.18, fig.91, 1822 (type-locality : Bengal).

Labeo morala, Gunther, *Cat. Fish. Brit. Mus;* **7**: 56, 1868: (Bengal). Beavan, *HBk. Fw. Fish. India,* : 64, 1877 (Bengal).

Labeo angra, Day, *Fish. India.,* : 541, pl. 128, fig.2, 1878 (Assam, Bengal and Orissa, also Mandalay in Upper Burma, and Sittoung in British Burma). Day, *Fauna Brit. Ind. Fish;* **1**: 267, 1889 (Assam, Bengal, Orissa, Mandalay in Upper and Sittoung in Lower Burma). Vinciguerra, *Ann. Mus. Civ. Stor. nat. Gen;* **2(9)**: 273, 1889 (Burma). Boulenger, *Ann. Mag. nat. Hist;* **(6)12**: 200, 1893 (South Shan States, Burma). Hora, *Rec. Indian Mus;* **22**: 167, 1921 (sluggish streams in the Manipur valley). Prashad and Mukerji, *Rec. Indian Mus;* **31**: 194, 1929 (Indawgyi Lake and streams, Myitkyina District, Upper Burma). Setna and Kulkarni, *J. Bombay nat, Hist. Soc;* **46**: 128, 1946 (freshwaters of Ahmedabad region). Menon, *Rec. Indian Mus;* **47**: 233, 1949 (Kosi river, Chhatra, Nepal). Sehgal, *J. Bombay nat Hist. Soc;* **53(1)**: 720, 1955 (Tezpur fish market, Assâm). Menon, *J. zool. Soc. India,* **14(1)**: 27, 1962 (Chindwin, Brahmaputra and Kosi drainages). Srivastava, *Fish. East. U.P.;* : 39, 1968 (River Rohini, Domingarh Gorakhpur). Datta and Majumdar, *Rec, zool. Surv. India,* **62(1&2)**: 80, 1970 (reported by Dutta Gupta *et al.*, in 1961 from Lakes in Jaipur and Udaipur Districts of Rajasthan cited). Ataur Rahman, *Bangladesh J. Sci. Ind. Res;* **9(3&4)**: 200, 1974 (name only, checklist of fishes of Bangladesh, Bengali names). Ataur Rahman, *Bull. Fw. Fish. Res. Sta;* **(1)**: 7, 1975 (name only, checkilst of fishes of Bangladesh, Bengali names). Srivastava and Venkateswarlu, *Indian J. zool;* **17(3)**: 180, 1976 (name only, list of fishes from Uttar Pradesh, local names). Khan and Kamal, *J. Bombay nat. Hist. Soc;* **76(3)**: 532, 1979 (River Kosi, Bihar). Johal and Tandon, *Pb. Fish. Bull;* **3(2)**: 9, 1979 (synonymy, brief description, East Punjab). Srivastava, *Fish. U.P. Bihar,* : 44, fig.28, 1980 (description of the fish, River Rohini). Jayaram, *HBk. Fw. Fish. India,* : 119, 1981 (key to species). Shreshta, *Fish Nepal,* : 65, 1981 (distribution given as Kosi, Narayani and Sagarmatha zones). Qureshi and Qureshi, *Indian Fish;* : 57, fig.37, 1983 (local names, description). Venkateswarlu, *Rec. zool. surv. India Occ. Pap;* **(56)**: 33, 1984 (name only, vernacular names). Venkateswarlu and Rama Rao, *Rec. zool. Surv. India Occ. Pap;* (87); 1, 1986 (correct name for Day's fishes). Talwar and Jhingran, *Inland Fish;* **1**: 198, 1991 (distribution given as Assam, West Bengal, Bihar, Uttar Pradesh, Punjab and Orissa. Bangladesh, Nepal and Burma).

Vernacular Names : *Kharsu, Thuthunahia raia* : HINDI; *Mochhna* : ORIYA, *Buttar* : PUNJABI

Specimens studied : Total 15 examples, 62.0-230.0 mm in SL.

(1) ZSI F 1324 one example, 90.0 mm in SL; Burma. F.Day.

(2) ZSI F 10904 two examples, 227.0-230.0 mm in SL; Namkawng Chaung stream at Kaimang, Myitkyina district, Upper Burma. B.N.Chopra.

(3) ZSI unregistered four examples, 69.0-80.0 mm in SL; Rowta river, Bhatan, Mangalwad, Assam. 30th December 1910.

(4) ZSI F 2558 five examples, 65.0-85.5 mm in SL; Fish market at Tezpur, Darrang District, Assam. B.Prashad and S.L.Hora, 4th November 1939.

(5) ZSI unregistered one example, 82.0 mm in SL; River Kosi near P.W.D. office, Chhatra, Nepal. 6th February 1948.

(6) ZSI F 4305 one example, 62.0 mm in SL; Imphal river near Dak Bungalow, Manipur. A.G.K. Menon and party, 28th January 1953.

(7) ZSI unregistered one example, 65.0 mm in SL; Fish market at Chhatra, Nepal. 5th February 1989.

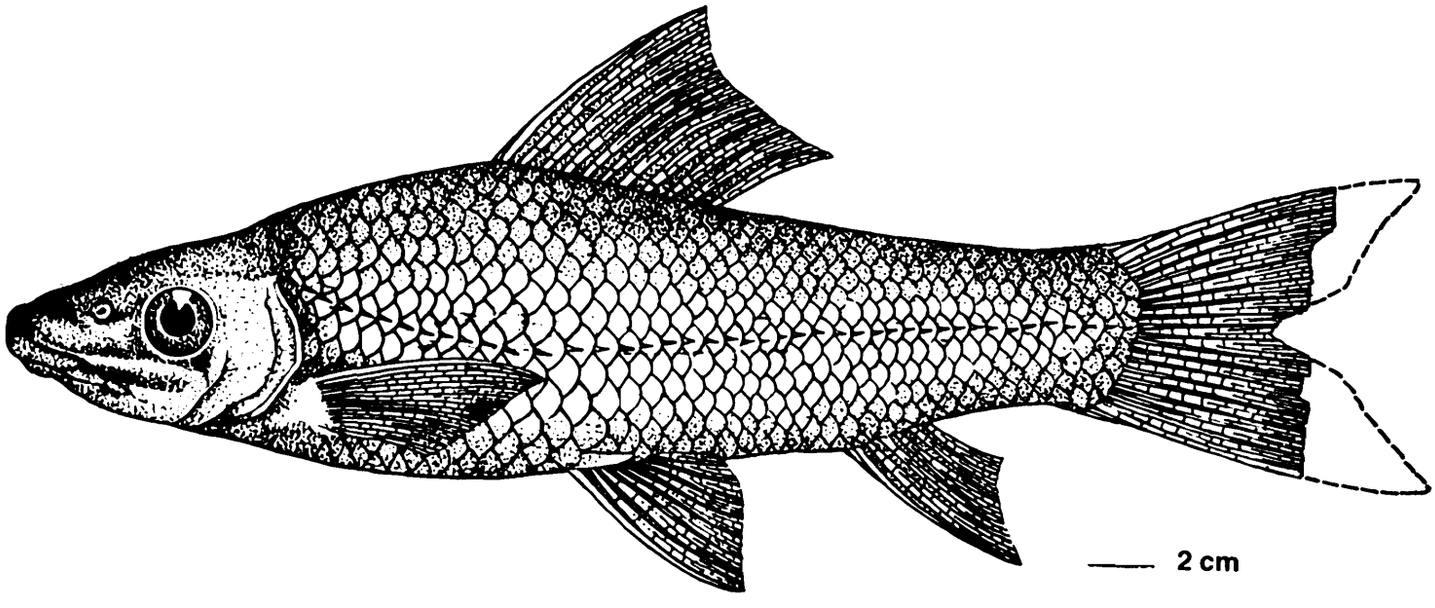

Fig. 6. *Labeo angra* (Hamilton)

Diagnosis : A oblong bodied *Labeo* with minute or a flap-like maxillary barbels. Dorsal fin with 10 or 11 branched rays. Lateral line scales 42 and a dark blotch above the 5th lateral line scale; generally a black or bluish stripe passing from the eyes to the base of the caudal fin, where it ends in a blotch. In certain examples the stripe may be absent.

Description : D.ii, 10 or 11; P.i, 16; V.i, 8;
A. ii, 5; C. 10+9; L. 1. 42.

Dorsal profile gently curved, body depth 26.3 (24.4-29.4), head length 25.6(22.2-27.8) in percent of standard length. Head moderate, width 58.8 (50.0-62.5), height at occiput 71.4 (62.5-83.3), snout length 38.5 (28.6-50.0), width of gape of mouth 27.8 (23.8-35.7), dorsal fin base 71.4 (62.5-83.3), eye diameter 26.3 (18.9-31.3) in percent of head length. Eye 71.1 (52.6-83.3) in percent of snout length, 66.6 (41.7-83.3) in percent of interorbital width. Snout blunt and

truncated, rostral fold overlaps the upper lip. Snout with lateral lobe. Postlabial groove continuous. Both jaws with rudimentary cartilaginous inner covering. A pair of rudimentary but fleshy barbels hidden in the labial goove; in some specimens in addition to maxillary barbels there is another pair of rudimentary barbels, rostral in origin.

Dorsal fin inserted nearer tip of snout than caudal fin base; outer margin concave. Pectoral fin inserted laterally, not reaching pelvic fin; anal fin when laid flat not reaching caudal fin base. Least depth of caudal peduncle 66.5 (55.6-71.4) in percent of its length. Caudal fin forked.

Distribution : INDIA : Northern India. BANGLADESH. MYANMAR and NEPAL.

Scales :

Lateral line scales	: 42
Predorsal scales	: 12-14
Prepelvic scales	: 9-12
Preanal scales	: 23-26
Dorsal fin/Ll.	: 7-8 1/2
Pelvic fin/Ll.	: 5 1/2-6 1/2
Anal fin/Ll.	: 6-7
Circumpeduncular scales	: 20-22

Gill rakers : 6-15/25-43

Size : Maximum : 22.0 cm (TL)

Colour : When alive, brownish along back with black or bluish stripe passing from eye to base of caudal fin, where it ends in a black blotch. In some examples a black blotch is present above the commencement of the lateral line with the black or bluish stripe along the side of the body lacking.

RELATIONSHIP : Closely related to *L. pangusia* (Hamilton). The following are the differentiating characters.

L. angra	*L. pangusia*
Both lips fimbriated	slightly fringed
Black or bluish stripe which runs from eye to the base of caudal	Stripe lacking
10 or 11 branched rays	9-11 branched rays
Lateral line scales 42	40-42
Dorsal fin/Ll. 7-8 1/2	7 1/2-8 1/2

Remarks : Hamilton, 1822 while describing *Cyprinus angra* (p.331) stated that except for the colour, this species resembles the subsequent one, *Cyprinus morala*, Gunther (1868) placed the specific name *'morala'* under *Labeo* Cuvier and gave a brief description. Later, Day (1877) merged it with *Labeo angra* (Hamilton) stating "Hamilton Buchanan divided *C. Morala* from *C. angra* as in the latter the eyes are red, the minute first dorsal ray is wanting and it has two instead of four barbels. The long barbels shown in the figure are evidently due to artistic error, as he says, "tendrils are minute", and in his MS he observed that one species differs from the other 'in anything but the colour'

Day (1889) reported that Burmese specimens lack the black lateral band but have the dusky blotch at the base of the commencement of the lateral line. Hora (1921) observed that instead of the maxillary barbels, there is a fleshy flap inside the groove on each of the mouth corner. Some specimens which we have examined lack the lateral band and have a fleshy flap instead of the maxillary barbels, confirming the above views.

ADDITIONAL DATA

Table : Non-meristic Characters

Labeo angra (Hamilton)

	Ratio	Mean	SD	Percentage	Mean	n
	Range			Range		
SL/Body depth	3.4 - 4.1	3.8	0.18	24.4 - 29.4	26.3	15
SL/LH	3.6 4.5	3.9	0.25	22.2 - 27.8	25.6	15
SL/Predorsal length	1.9 2.3	2.1	0.09	43.5 - 52.6	47.6	15
SL/Preanal length	1.2 - 1.4	1.3	0.04	71.4 - 83.3	76.9	15
SL/Prepelvic length	1.8 - 2.1	1.9	0.07	47.6 - 55.6	52.6	15
Snout/Eye	1.2 1.9	1.4	0.31	52.6 - 83.3	71.4	15
Iow/Eye	1.2 2.4	1.5	0.31	41.7 - 83.3	66.6	15
LH/Eye	3.2 5.3	3.8	0.60	18.9 - 31.3	26.3	15
LH/Snout	2.0 - 3.5	2.6	0.39	28.6 - 50.0	38.5	15
LH/Head width	1.6 2.0	1.7	0.10	50.0 - 62.5	58.8	15
LH/HT. at occpt.	1.2 - 1.6	1.4	0.10	62.5 - 83.3	71.4	15
LH/Width of mouth	2.8 4.2	3.6	0.41	23.8 - 35.7	27.8	15
LH/LCPD	1.2 - 1.6	1.4	0.18	55.6 - 83.3	71.4	15
LH/HCPD	1.8 2.7	2.2	0.24	37.0 - 55.6	45.5	15
LH/Dorsal fin base	1.2 1.6	1.4	0.13	62.5 - 83.3	71.4	15
LCPD/HCPD	1.4 1.8	1.5	0.12	55.6 - 71.4	66.5	15

Labeo fisheri Jordan & Starks
(Fig. 7)

Labeo fisheri Jordan and Starks, *Ann Carnegie Mus;* **11**: 436, 1917 (type-locality : Kalu gadeya Sri Lanka). Deraniyagala, *Col. Atlas Verteb. Ceylon,* **1**: 42, 1952 (mountain streams near Kandy and Matale, Ceylon). Jayaram, *HBk. Fw. Fish. India,* : 118, 1981 (Sri Lanka). Munro, *Marine and Fw. Fish. Ceylon,* : 47 1982 (mountain streams of Sri Lanka). Pethiyagoda, *Fw. Fish. Sri Lanka.* : 84, 1991 (Sri Lanka).

Labeo (Morulius) godeya Deraniyagala, *Spolia Zeylanica*, **15**: 75, 1929 (Mountain streams near Kandy).

Vernacular Names : *Gadaya, Kalu gadaya* : SINHALESE

Specimen studied : Total one example, 298.0 mm in SL.

(1) SU 23234/1 one example, 298.0 mm in SL; Mahaweli river, Kandy, Sri Lanka. W.K. Fisher, 1914.

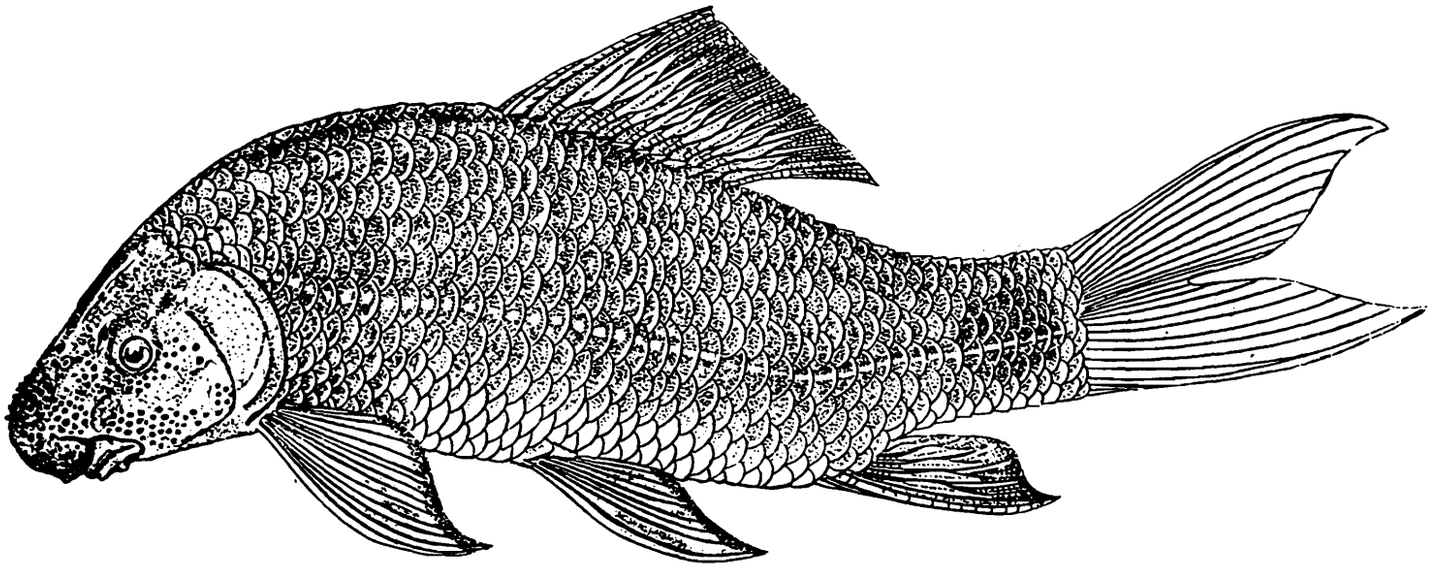

Fig. 7. *Labeo fisheri* Jordan & Starks

Diagnosis : A deep bodied *Labeo* with lateral line scales 40-42. Dorsal fin with 10-12 branched rays. Well developed tubercles on snout and chin, maximum on snout. Rostral fold overlaping upper lip; labial fold conspicuous. Barbels one pair, maxillary hidden in the lateral groove, sometimes a rudimentary rostral pair.

Description : D.ii or iii, 10-12; P.i, 15-16; V.i,8;
A.ii of iii, 5; C. 10+9; Ll. 40-42.

Dorsal profile gently arched, body depth 31.7, head length 26.8 in percent of standard length. Head large, width 66.7, height at occuput 75.2, snout length 50.0, width of gape of mouth 28.7, dorsal fin base 78.7, eye diameter 13.7 in percent of head length. Eye 27.5 in percent of snout length, 28.2 in percent of interorbital width. One pair of maxillary barbels, hidden in the lateral groove, sometimes a rudimentary rostral pair. Snout with thick-set rostral fold, overlaping the upper lip; lateral lobe well developed. Horny tubercles on snout and chin. Lips fleshy. Postlabial groove continuous. Pectoral fin reaching pelvic fin; anal fin when laid flat reaches more than half of caudal peduncle. Least depth of caudal peduncle 98.0 in percent of its length. Caudal fin forked.

Distribution : SRI LANKA : Mountain streams near Kandy and Matale.

Scales :

Lateral line scales	: 40-42
Predorsal scales	: 16-18
Prepelvic scales	: 13
Preanal scales	: 30-35
Dorsal fin/Ll.	: $7^1/_2$
Pelvic fin/Ll.	: $5^1/_2$
Anal fin/Ll.	: 6
Circumpeduncular scales	: 20

Gill rakers : 15/47

Size : Maximum : 36.0 cm (TL)

Colour : Olive dorsally, sides golden with a red reflection. A greenish lateral stripe along upper half of body; dark brown spot on caudal peduncle. Dorsal and paired fins olive. Caudal and anal fins from olive to bright orange.

Relationship : Allied to the Indian species *L. calbasu* (Hamilton), but distinguished by the colour pattern. The counts also differ : 10-12 branched dorsal fin rays (vs 12-15 in *L. calbasu*). Lateral line scales 40-42 (vs. 40-44). Predorsal scales 16-18 (vs 10-14).

Remarks : The present description is mainly based on the only specimen preserved in ZSI, Calcutta and few data from Deraniyagala (1952).

Pethiyagoda (1991) in his treatise on the freshwater fishes of Sri Lanka states that this is too rare and difficult to capture.

Group - III
THE *DERO* GROUP

This group comprises the following species :

(1) *Labeo dero* (Hamilton, 1822, p.277)
(2) *Labeo diplostomus* (Heckel, 1838, p.67)
(3) *Labeo dyoceilus dyocheilus* (McClelland, 1839, p.268)
(4) *Labeo microphthalmus* Day, 1877, p.542
(5) *Labeo devdevi* Hora, 1936, p.323
(6) *Labeo dyocheilus pakistanicus* Mirza and Awan, 1976, p.43
(7) *Labeo gedrosicus* Zugmayer, 1912, p.598

Common characters of these species are as below :

1. Snout is always with a depression
2. Rostral fold fleshy, overlapping the upper lip
3. Lips fleshy
4. Both lips continuous at the corner of the mouth
5. Postlabial fold interrupted
6. One pair of small maxillary barbels
7. Mouth crescentic
8. Dorsal fin with ii or iii simple rays and not more than 12 branched rays
9. Lateral line scales 40-43
10. Predorsal scales 12-18
11. Prepelvic scales 10-12
12. Preanal scales 23-27
13. Scales between dorsal fin/Ll. 7-9$^1/_2$
14. Scales between pelvic fin/Ll. 5$^1/_2$-8$^1/_2$
15. Scales between anal fin/Ll. 5$^1/_2$-7$^1/_2$
16. Circumpeduncular scales 19-25

The following is a comparative table of differentiating characters of the seven species of the group :-

	Dorsal fin	Ll. scales	Predorsal scales	Prepelvic scales	Preanal scales	Dorsal fin/Ll.	Pelvic fin/Ll.	Anal fin/Ll.	Circum-peduncular scales
L. dero (Hamilton)	ii-iii, 9-10	41-43	13-15	10-12	23-25	$8^1/_2$-$9^1/_2$	$6^1/_2$-$7^1/_2$	$6^1/_2$-$7^1/_2$	22-26
L. diplostomus (Heckel)	ii, 10-11	41-43	14-15	10-11	23-24	$8^1/_2$-9	$7^1/_2$-$8^1/_2$	$7^1/_2$	24-25
L. dyocheilus dyocheilus (McClelland)	ii-iii, 9-10	40-43	12-14	10-12	24-27	$7^1/_2$-$8^1/_2$	$5^1/_2$-$6^1/_2$	$5^1/_2$-$6^1/_2$	19-23
L. microphthalmus Day	iii, 10	41-43							22
L. devdevi Hora	ii, 12	40-41	17-18	10-12	23-24	7-8	$5^1/_2$-$6^1/_2$	$5^1/_2$-$6^1/_2$	19-21
L. dyocheilus pakistanicus Mirza & Awan	iii, 10	40-42	15	12	26	$8^1/_2$-	$6^1/_2$-$7^1/_2$	$5^1/_2$	22
L. gedrosicus Zugmayer	iii, 10	43					$7^1/_2$		

Jayaram and Das (1981) clarified the systematic position of *L. devdevi*. In respect of *L. microphthalmus* the systematic status is doubtful. Day (1878) while describing the species called it *L. dero* in the synopsis (p.535) and in the description as *L. microphthalmus*. Records of the species are also rare. From the comparative table above, it may be seen the specific status of the species is uncertain. Pending examination of material, *L. microphthalmus* is retained as a valid species in this study.

Labeo dero (Hamilton)

(Fig. 8)

Cyprinus (Bangana) dero Hamilton, *Fish. Ganges.* : 277, 385, pl.17, fig.78. 1822 (type-locality : Brahmaputra river).

Cyprinus (Bangana) falcata Gray, *Ill, Indian zool;* 1830-34.

Gobio malacostomus McClelland, *Asiat. Res;* **19(2)**: 280, 1839.

Gobio ricnorhynchus McClelland, *Asiat. Res;* **19(2)**: 279, 363, pl.55, fig.1, 1839 (Northern parts of Bengal). Valenciennes (in Cuvier and Valenciennes), *Hist. nat. Poiss;* **16**: 464, 1842.

Chondrostoma semivelatus Valenciennes (in Cuvier and Valenciennes), *Hist. nat. Poiss;* **17**: 402, 1844. Beavan, *HBk. Fw. Fish. India,* : 187, 1877 (Madras).

Lobocheilus falcatus Bleeker, *Verh. Bat. Gen;* **25**: 66, 1853 (Bengal).

Lobocheilus richnorhynchus, Bleeker, *Verh. Bat. Gen;* **25**: 66, 1853.

Labeo falcatus, Gunther, *Cat. Fish. Brit. Mus;* **7**: 58, 1868 (Peninsula of India, Terrya ghat). Beavan, *HBk. FW. Fish. India,* : 64, 1877 (Bengal and Assam).

Labeo ricnorhynchus, Gunther, *Cat. fish. Brit. Mus;* **7**: 57, 1868 (Himalayan region, Peshwar, Nepal, Sargu river at Begesert, Jammu). Day, *Proc. zool. Soc. Lond;*·: 373, 1869 (Orissa). Beavan. *HBk. FW. Fish. India,* : 64, 1877 (base of Himalayas and Bengal). Fowler, *Proc. Acad. nat. Sci. Philad;* **76**: 94, 1924 (Jamuna river, Northern India).

Labeo diplostomus (nee Heckel) Day, *Fish India,* : 540, 177 Day, *Fauna, Brit. Ind. Fish.* 1, p.265. Hora & Mukerji, *Rec. Indian Mus.,* **38(2)**, : 142, 1936 considered synonym of *L. dero*)

Cirrhina sindensis Day, *J. Asiat. Soc. Beng;* **41(2)**: 319, 1872 (type-locality : Sind hills). Beavan, *HBk. F.w. Fish. India,* : 186, 1877 (Sind hills).

Cyprinus dero, Beavan, *HBk. F.w. Fish India,* p.186, 211, 1877 (Brahmaputra river).

Labeo sindensis, Day, *Fish. India.* : 535, 544, pl.132 fig.2, 1877 (Sind, the Punjab, Lahore, Hardwar, the Deccan at Poona). Day, *Fauna. Brit. Ind. Fish;* **1**: 258, 1889. Hora, *Rec. Indian Mus;* **25**: 377, 1923 (Salt range, Punjab). Khan, *J. Bombay nat Hist. Soc;* **37(3)**: 655, 1935 (Punjab). Menon, *Rec. Indian Mu;* **47(2)**: 233, 1949 (Kosi river, Nepal). Jayaram, *HBk. FW. Fish. India,* : 118, 1981 (India : Hardwar, Poona, Pakistan and Nepal). Johal and Tandon, *Bull, Punjab. Univ;* **32**: 146, 1981 (Punjab).

Labeo almorhae Chaudhuri, *Rec. Indian Mus;* **7(5)**: 438, pl.38, fig.2, 1912 (type-locality : Almora, Western Himalayas).

Labeo rilli Chaudhuri, *Rec. Indian Mus;* **7(5)**: 439, pl.38, fig.4, 1912 (type-locality : River Gandak, Saran).

Labeo henshawi Fowler, *Proc. Acad. nat. Sci. Philad;* **76**: 98, fig.9, 1924 (type-locality : Kalla reddee, Loodianali, Roorkee).

Labeo lippus Fowler, *Proc. Acad. nat. Sci. Philad;* **82**: 512, fig. 6 & 7, 1935 (type-locality : Meng Pek, Mong Lin, Shan States).

Labeo dero, Fowler, *Proc. Acad. nat. Sci. Philad;* **76**: 94, 1924 (Roorkee, Gaggar river, Markanda river, Sursutta river). Hora and Mukerji, *Rec. Indian Mus;* **38(2)**: 134, 142, figs. 3, 1936 (Naga hills). Hora and Misra, *Rec. Indian Mus;* **38(3)**: 341, 342, fig. 1 and 2, 1936 (sexual dimorphism, specimens from Eastern Doon discussed). Hora *Rec. Indian. Mus;* **39(1)**: 44, 1937 (name only, Tribeni, Nepal Terrain). Hora, *Rec. Indian Mus;* **39(4)**: 339, 1937 (Nandhaur and Kalaunia rivers, Kumaon Himalayas). Shaw and Shebbeare, *J. Asiat. Soc. Beng;* **23**: 53, text-fig.47, 1937 (Terai and Duars, North Bengal). Hora, *Proc. nat. Inst. Sci. India,* **4**: 406, 1938. Hora and Nair, *Proc. nat. Inst. Soc. India,* **10(1)**: 155 (Rungbee and Ryriyang, Darjeeling district); 156, 1944 (gut content recorded). Menon, *J. Bombay nat. Hist. Sci;* **48(1)**: 1948-49 (*L. diplostomus* (Heckel) synonymised). Motwani and David, *J. zool. Soc. India,* **9(1)**: 11, 1957 (Sone river). Misra, *Rec. Indian Mus;* **57(1-4)**: 161, 1959 (India : Assam, Darjeeling District, Eastern Himalayas, Punjab, U.P.; Western Himalayas, Pakistan, Bangladesh, China). Dewitt,

Stanford Ichth. Bull; **7(4)**: 76, 84, 1960 (Nepal). Silas, *J. Bombay nat. Hist Soc;* **57(1)**: 71, 1960 (name only, Kashmir). Motwani, Jayaram and Sehghal, *Trop. Ecol;* 3(1-2): 17, 1962 (Brahmaputra river system). Menon, *J. zool. Soc. India,* **14(1)**: 27, 1962 (Brahmaputra, Kósi, Bagmati and Gandak, Rapti, Karnali, Kali, Ramganga, Ganges and Jamuna and Indus drainages). Lal and Chatterjee, *J. zool. soc. India,* **14(2)**: 241, 1962 (Eastern Doon). Singh, *Ichthyologica,* **3(1-2)**: 1964 (Doon valley). Tandon and Sharma, *Res. Bull. Punjab Univ;* 16(4): 335, 1965 (River Ghaggar). Tandon and Sharma, *Res. Bull. Punjab Univ;* **18(3-4)**: 511, 1967 (Budha-nallah, Punjab). Dhingara and Vasishta, *Res. Bull. Punjab Univ;* **18(3&4)**: 511, 1967 (Hoshiarpur District, Punjab). Srivastava, *Fish. East. U.P.*; : 41, fig.25, 1968 (Gorakhpur). Grover, *Cheetal,* **11(2)**: 24, 1969 (Song and Suswas rivers, Doon). Grover, *G.K. Vishwa J. Sci. Res;* **2**: 116, 1970 (Song river, Doon valley, U.P.). Agarwal and Tyagi, *Agra Univ. J. Res; (Sci);* **18(1)**: 22, 1970 (Muzaffarnagar). Pant, *Rec. zool. Surv. India,* **64(1-4)**: 88, 1970 (Kumaon hills). Das and Nath, *Kashmir Sci;* **8(1&2)**: 11, 12, 21, 1971 (Jammu, Poonch, Kashmir valley). Sehgal, Shukla and Shaw, *J, Inland Fish. Soc. India,* **3**: 66, 71, 1971 (Tawi river and its tributaries, Jammu and Kashmir). Venkateswarlu, *Indian J. zool;* **13(3)**: 122, 1972 (Bihar). Tandon and Johal, *Res. Bull. Punjab Univ;* 23(1-2), 45, 1972 (Ropar District, Punjab). Mirza, *Biologia,* **18(2)**: 164, 1972 (South and South eastern parts of Baluchistan; *L. sindensis* synonymised). Bhatnagar, *J. Inland Fish. Soc. India,* **5**: 135, 1973 (Bhakra reservoir near Bilaspur, Lunkhar farm), Tilak, *Cheetal,* **15(4)**: 36, 1973 (North Bengal), Mirza, *Biologia,* **19(1&2)**: 6 (river Khiali, a tributary of river Kabul, Swat valley, Pakistan); 125, 1973 (Maradon, Swat valley). Mirza and Ahmad, *Biologia,* **20(1)**: 100, 1974 (name only, Dra-Zinda and Sheikh-nallah, NWEP, Pakistan). Mirza and Omer, *Pakistan J. zool;* **6(1-2)**: 193, 1974 (name only, spring near Hasan abdal, Pakistan). Ataur Rahman, *Bangladesh J. Sci. Ind. Res;* **9(3&4)**: 201, 1974 (name only, checklist of Bangadesh fishes, Bengali names). Menon. *Inl. Fish. Soc. India Spl. Publ;* **(1)**: 32, 1974 (checklist of fishes of Himalayan and Indo-Gangetic Plain). Sehgal, *J. Bombay nat. Hist. Soc;* **70(3)**: 446, 470 (Bilaspur, Chamba, Mandi, Sirmour). Motwani and Saigal, *Indian J. Fish;* **21(1)**: 109, 1974 (Sarda reservoir, Philibhit, U.P.) Ataur Rahman, *Bull. FW. Fish. Res. Sta;* **(1)**: 7, 19, 1975 (name only, checklist of Bangladesh fishes; Bengali name). Basir and Mirza, *Bull. Hydrobiol. Res. Gordon college,* **9(1)**: 94, 1975 (River Sutlej, Gundasinghwala, Pakistan). Badola, *Indian J. zool;* **16(1)** 60, 62, 1975 (Pauri-Garhwal). Hussain, *Cheetal,* **16(4)**: 56, 1975 (Rajaji sanctuary, Saharanpur District, U.P.). Mirza, *Bijdr. dierk;* **45(2)**; 172, 1975 (Pakistan, allover). Omer and Mirza, *Bioogia,* **21(2)**: 202, 1975 (not common in Hazara District, Pakistan). Mirza and Waheed-ud-din, *Pakistan J. zool;* **8(1)**: 98, 1976 (River Punch, Azad Kashmir, Pakistan). Mirza and Awan, *Biologia,* **22(1)**: 29, 43, 1976 (Son-Sakesar valley, Punjab, Pakistan). Mirza, *Biologia,* **22(1)**: 116, 1976 (name only, list of fishes from Montane and submontane regions of Pakistan with common name). Husain, *Cheetal,* **17(2)**: 41, 1976 (Corbet National Park, U.P.). Grover, *Madras J. Fish;* **7**: 19, 1976 (Doon valley). Srivastava and Venkateswarlu, *Indian J. zool;* **17(3)**: 180, 1976 (name only, list of fishes from U.P. with local names, Garhwal-Kumaon). Venkateswarlu, *Acta Ichthyol. Piscat;* **6(1)**: 90, 1976 (Patna District, Bihar). Tilak and Husain, *Zool. Jb. Syst;* **104**: 267, 296, 1977 (Bhakra reservoir, Chamba, Kangra, Mandi, Sirmour, Giri river). Grover and Baloni, *Geobios,* **4(6)**: 249, 1977 (Tehri-Garhwal). Grover and Gairola, *Geobios,* **4(6)**: 262, 1977 (Giri river and Yamuna, Paonta valley, H.P.). Adholia, *Geobios,* **4(6)**: 273, 1977 (Betwa river, M.P.). Srivastava and Srivastava, *Working Plan Chakrata Forest Divn;* p.2, 1977 (Chakrata). Venkateswarlu, *Acta Ichthyol. Piscat;* **7(7)**: 48, 1977 (River Poonpun, Bihar, India). Tilak and Hussain, *Newsl. zool. Surv. India,* **3(5)**: 281, 1977 (Sirmour District, H.P.). Sen, *Seafd. Expt. J;* **10(1)**: 3, 1978 (name only, Assam, scientific, local and English

names). Sinha, *Siwalik Van Prabhag,* **2**: 694, 1978 (Rajaji sanctuary Saharanpur, U.P.). Tilak and Jenuja, *Cheetal,* **20(1)**: 35, 1978 (Kangra District, H.P.). Hussain, *Cheetal,* **21(1)**: 32, 1979 (Corbett National Park). Tilak and Sinha, *Zool. Jb. Syst;* **106**: 179, 187, 1979 (Madhya Pradesh). Venkateswarlu and Menon, *Acta Ichthyol Piscat;* **9(1)**: 51, 1979 (checklist of fishes of Ganges). Johal and Tandon, *Pd. Fish. Bull;* **3(2)**: 11, 1979 (synonymy, brief description, East Punjab). Mirza, *Proc. Ist Pakistan Congr. Zool;* p.12, 1980 (name only, distribution in Pakistan and elsewhere; *L. diplostomus, L. microphthalmus* and *L. sindensis* considered synonyms). Tandon, Mohindru and Johal, *Pb. Fish. Bull;* **4(1)**: 27, 1980 (Budhanallah). Johal and Dhillon, *Res. Bull. Punjab Univ;* **32**: 107, 1981 (Rajasthan). Butt and Mirza, *Biologia,* **27(2)**: 152, 1981 (Beshu valley, NWFP, Pakistan). Johal and Tandon, *Res. Bull. Punjab Univ;* **32**: 147, 1981 (Punjab). Badola and Singh, *Proc. nat. Acad. Sci. India,* **51(B)**: 135, 1981 (River Alaknanda, Garhwal, U.P.). Jayaram, *HBk. FW. Fish. India,* : 119, 1981 (key to species). Shreshtha, *Fish. Nepal,* : 71, 1981 (Trisuli river, Kosi river, Sunkosi river, Manohari river and Karnail river). Coad, *Nat. Mus. Natur. Sci;* (Zool); **14:** 11, 1981 (Kabul river near Darcentah). Baloni and Grover, *Indian J. Forest;* **5(2)**: 131, 134, 1982 (Kedar valley, Chamoli, Garhwal). Sharma and Grover, *An Introduction to Indian Fish;* : 31, 192 (Hilly regions). Lone, *Inland Fish. Aquacult. Pakistan,* : 42, 1983 (Dal Lake, Kashmir). Mirza and Omer, *Biologia,* **30(1)**: 79, 1984 (distribution only, Pakistan). Tilak and Baloni, *Rec. zool. Surv. India,* **81(3&4)**: 260, 1984 (Tehri-Garhwal, U.P.). Sen, *Rec. zool. Surv. India Occ. Pap;* **(65)**: 85, 1985 (Assam). Mirza and Januja, *Biologia,* **30(2)**: 237, 1984 (River Jhelum, Muzaffarabad, Azad Kashmir, description). Tilak and Sati, Cheetal, **26(2)**: 34, 37, 1985 (Kaziranga National Park, Assam). Viswanath Singh and Tombi Singh. *Intl. J. Acad. Ichthyol. Proc. 5th AISI;* **6**: 86, 1985 (Sesmaai Chakpi stream, Tengnoupet District, Manipur). Singh, Badola and Dobriyal, *J. Bombay nat. Hist. Soc;* **84(1)**: 127, 1987 (distribution, Garhwal Himalayan river system). Mirza and Ahmad, *Biologia,* **33(2)**: 258, 1987 (Bhera, River Jhelum, Shargadha District, Pakistan). Mirza and Abubakr, *Biologia,* **34(1)**: 46, 1988 (Chasma Lake, Mianwali District, Pakistan). Mirza and Javeed Khan, *Biologia,* **34(1)**: 152, 1988 (Marala, river Chenab, Sialkot District, Pakistan). Talwar and Jhingran, *Inland Fish;* **1**: 204, 1991 (distribution).

Vernacular Names : *Nepura, Silgharia* : ASSAME; *Katalkusu, Kul-ka-batta, Kursha* : BENGALI; *Arangi, Basanhuaraia, Bonga Golaraia, Mohaylee* : HINDI; *Goddi, Gurdi, Kathlegi, Rahu* : NEPALI; *Laya* : ORIYA; *Gid, Giddah* : PUNJABI.

Specimens studied : Total 25 examples, 40.0-247.0 mm in SL.

(1) ZSI F three examples, 78.0-110.0 mm in SL. Belsuri river, Assam. 12th November 1939.

(2) ZSI F seven examples, 152.0-215.0 mm in SL; Kachinwala and Suswa river, Dehra Dun, Uttar Pradesh. S.L.Hora

(3) ZSI F 11234 one example, 117.0 mm in SL; Roorkee (Academy of Natural Science, Philadelphia, U.S.A.; exchange).

(4) ZSI F 2703 three examples, 87.0-94.0 mm in SL; Asan river, Dehra Dun, Uttar Pradesh.

(5) ZSI F 11235 two examples, 40.0-70.0 mm in SL; Maarkanda river (Academy of Natural Science, Philadelphia, U.S.A.; exchange).

(6) ZSI F 202 two examples, 133.0-159 mm in SL; Kosi river at Khairana, Kumaon Hill Survey party.

(7) ZSI F 2453 three examples, 82.0-104.0 mm in SL; Belsuri river, foot hills of Kamang Frontier Division, NEFA. Indo-Swiss Expedition party, 27th February 1961.

(8) SRS/ZSI unregistered four examples, 106.0-247.0 mm in SL; River Cauvery at Trichy. K.V. Lakshminarayana and party, 19th .December 1991.

Diagnosis : A *Labeo* with 11 or 12 (ii, 9 or 10) dorsal fin rays; lateral line scales 41-43; Snout conical, with many well packed horny tubercles; no lateral lobe.

Description : D. ii of iii, 9-10; P.i, 14-16; V.i.8;
A.ii, 51; C. 10+9; ll. 41-43.

Dorsal profile gently arched, body depth, 26.0 (21.6-30.4), head length 24.8(21.5-28.2) in percent of standard length. Head moderate, width 52.9 (40.9-64.9), height at occiput 70.7 (61.3-80.0), width of gape of mouth 30.2 (22.7-37.7), snout length 38.3 (27.8-48.8), dorsal fin base 70.9 (52.6-88.5), eye diameter 20.3 (15.6-25.0) in percent of head length. Eye 64.9 (38.9-90.9) in percent of snout length, 65.9 (40.0-91.7) in percent of interorbital width. One pair of short maxillary barbels often hidden in the labial groove. Snout conical with a deep depression across it, with out any lateral lobe; snout with horny tubercles. A deep groove across the chin; postlabial groove interrupted. A horny covering to the lower lip; dorsal region of lower lip with large papillae.

Dorsal fin inserted midway between tip of snout and caudal fin base. Pectoral fin not reaching the pelvic, latter does not reach the anal. Caudal deeply forked. Least depth of caudal peduncle 74.9 (66.7-83.3) in percent of its length.

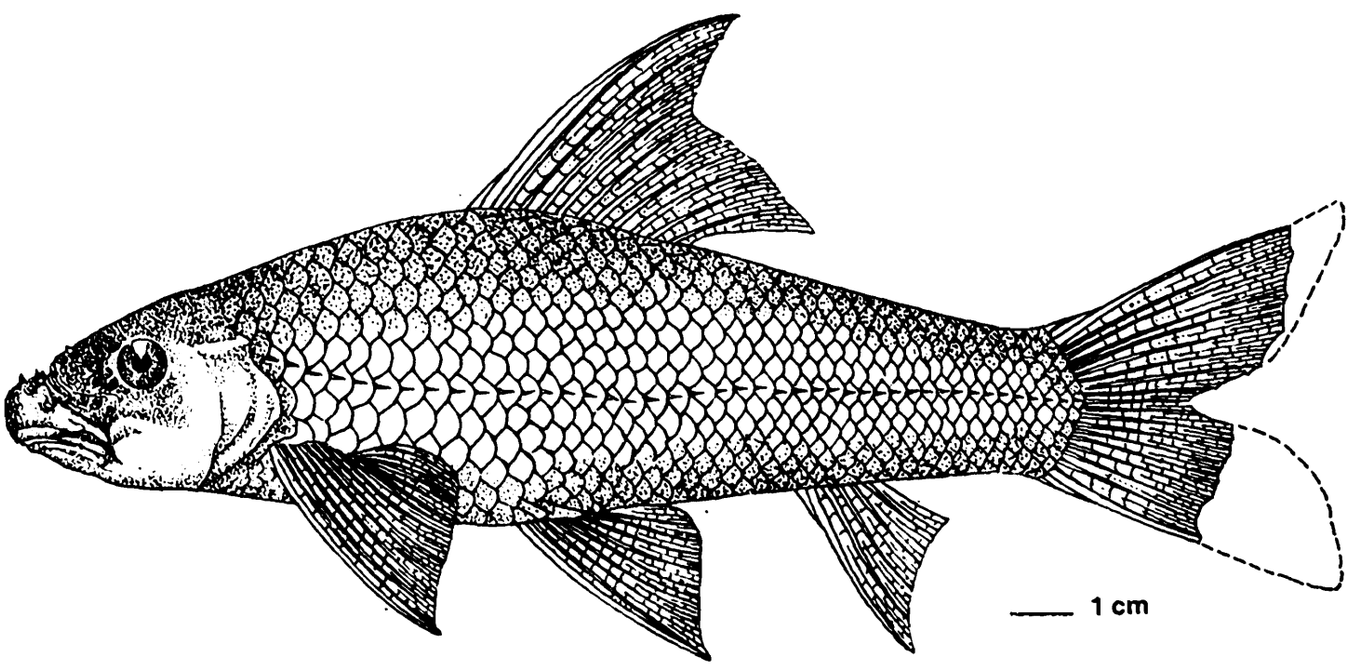

Fig. 8. *Labeo dero* (Hamilton)

Distribution : INDIA : Throughout except Kerala. PAKISTAN : West Punjab and Sind Hills. AFGHANISTAN : Kabul river. BANGLADESH. NEPAL and MYANMAR.

Scales

Lateral line scales	: 41-43
Predorsal scales	: 13-15
Prepelvic scales	: 10-12
Preanal scales	: 23-25
Dorsal fin/Ll.	: $8^1/_2$-$9^1/_2$
Pelvic fin/Ll.	: $6^1/_2$-$7^1/_2$
Anal fin/Ll.	: $6^1/_2$-$7^1/_2$
Circumpeduncular scales	: 22-23

Gill rakers : 4-8/26-28

Size : Maximum: 32.5 cm (SL).

Colour : When alive, olive green on the dorsal region; gradually fading and silvery on the ventral side. Fins with reddish tinge. When preserved in formalin, dorsal fin becomes dark, region below lateral line becomes dark brown.

Relationship : It is allied to *L. diplostomus* (Heckel) and *L. devdevi* (Hora). A comparison is given below :

L. dero	*L. devdevi*	*L. diplostomus*
Head moderate	Head short	Head moderate
Snout 27.8-48.8 in percent of head length, with spiny tubercles and a deep groove.	Snout 36.2-38.9 in percent of head length, tubercles not consipcuous, a less marked depression.	32.5-38.2 in percent of head length. Less marked depression.
Scales along lateral line 41-43; $8^1/_2$-$9^1/_2$ between dorsal fin and lateral line.	40-41 7-8	41-43 $8^1/_2$-9
$6^1/_2$-$7^1/_2$ scales between lateral line and pelvic base	$5^1/_2$-$6^1/_2$ scales between lateral line and pelvic fin base.	$7^1/_2$-$8^1/_2$ scales between lateral line and pelvic line.
Distribution Throughout India. Pakistan. Nepal Bangladesh and up to Myanmar.	 Myanmar Thailand	 Sind hills in Pakistan. U.P., Assam Bangladesh

Remarks : Day (1872) in his report on the specimens obtained from Sind hills, described *Cyprinus sindensis*, dorsal fin with 10 branched rays and lateral line scales 43. While further describing all other characteristics of *Labeo sindensis* in Fish. India (1878), he stated "Snout rather overhanging the mouth. Interorbital space slightly convex : no lateral lobe to snout, which in some specimens has a deep groove across it and is covered with glands. Lips continuous at the angle of the mouth; the lower lip thin, with a smooth edge and reflected from off the mandible which has a thin cartilaginous covering. Barbels, a short maxillary pair" These and other characters are similiar to that of *Labeo dero* (Hamilton) which Day (1878) erroneously synonymised with *Labeo diplostomus* (Heckel); both are distinct species.

Day's *Labeo sindensis* distribution also overlaps with the distribution of *L. dero* (Hamilton). He stated *L. sindensis* is found in "Sind, the Punjab (at Lahore and Hurdwar), also the Deccan at Poona" while for *L. dero*, as along the Sind hills and Himalayas; also in the Brahmaputra in Assam. Later, Hora (1923) obtained a specimen from Kas Gandhala below Choa Shaw, Salt Range, Punjab, and he also assigned it to *L. sindensis*. Ahmad (1943), however, made no mention of it. Menon (1949) reported this fish from Nepal, but Shrestha (1981) didn't make any mention of it.

Examination of some specimens from Krishna unambiguously proved that all characters which are attributed to *L. sindensis* are exactly shared by *L. dero*. Hence *L. sindensis* is synonymised with *L. dero*.

Chaudhuri .(1912) described some specimens as new species of *Labeo* from North India. During the course of our study we had the opportunity to study the type specimens of *L. almorae* (ZSI F 2014/1) from Almora, Western Himalayas, and *L. rilli* (ZSI F 4654/1) collected by M.Mackenzie, from river Gandak, Saran, Bihar, which shows that major meristic characters of the above two species overlap with *L. dero*, a widely distributed fish. Similarly, Fowler (1924) described *L. henshai* from Ludhiana, which also shares the characters of *L. dero*. During the Siamese expedition Fowler (1935) got a specimen from Mon Lin Shan States and gave it the new name *L. lippus*. From the characters and text-figure it could be inferred that it is *L. dero* with some variation. Further, Fowler (1934) collected a fish from Sop Lao, Shan States and named it *L. soplaoensis*, after its type locality. Talwar and Jhingran (1991) synonymised it with *L. dero*, but its characters are not attributable to the genus *Labeo* Cuvier, hence it has not been included in the present study.

L. dero was considered available only in Western Himalayan base, Northern India, Bangladesh, Pakistan and Nepal. But this has been recently recorded from River Cauvery and Krishna. Fowler (1935) recorded this fish under name *L. lippus*, from Myanmar, which has been synonymised with *L. dero*. Hence, the distribution of this species is now extended up to Myanmar.

ADDITIONAL DATA

Table : Non-meristic Characters

Labeo dero (Hamilton)

	Ratio Range	Mean	SD	Percentage Range	Mean	n
SL/Body depth	3.3 4.6	3.9		21.6 30.4	26.0	25
SL/LH	3.5 4.7	3.9		21.5 - 28.2	24.8	25
SL/Predorsal length	2.1 2.4	2.2		41.8 48.8	45.3	25
SL/Preanal length	1.3 - 1.5	1.4		65.4 - 78.7	72.0	25
SL/Prepelvic length	1.8 2.0	1.9		49.0 55.2	52.1	25
Snout/Eye	1.1 2.6	1.8		38.9 90.9	64.9	25
Iow/Eye	1.2 2.5	1.6		40.0 91.7	65.9	25
LH/Eye	4.0 6.4	4.9		15.6 25.0	20.3	25
LH/Snout	2.1 3.6	2.8		27.8 - 48.8	38.3	25
LH/Head width	1.5 2.4	1.9		40.9 - 64.9	52.9	25
LH/HT. at occpt.	1.3 1.6	1.4		61.3 80.0	70.7	25
LH/Width of mouth	2.7 - 4.4	3.4		22.7 - 37.7	30.2	25
LH/LCPD	1.4 2.2	1.6		45.5 - 74.4	59.8	25
LH/HCPD	1.7 2.8	1.2		36.7 - 58.5	47.4	25
LH/Dorsal fin base	1.1 1.9	1.4		52.6 - 88.5	70.9	25
LCPD/HCPD	1.2 - 1.5	1.3		66.7 - 83.3	74.9	25

Labeo diplostomus **(Heckel)**

(Fig. 9)

Varicorhinus diplostmus Heckel, *Fische Caschmir;* : 67 pl.11, 1838 (type-locality : Kashmir).

Labeo diplostomus, Day, *Fish. India.* : 540, pl.129, fig.2, 1878 (Sind hills, Himalaya, Brahmaputra). Day, *Fauna. Brit. Ind. Fish;* **1**: 265, 1889 (Sind hills, Himalaya, Brahmaputra). Mukerji, *Mem. Conn. Acad;* 10 Art., : 18, 329, 1936 (description). Das and Subla, *Ichthyologica* **3(1&2)**: 58, 1964 (name only, Kashmir). Ataur Rahman, *Bangladesh J. Sci. Ind. Res;* **9(3&4)**: 200 1974 (name only, checklist of Bangladesh fishes, Bengali names). Mirza, *Proc. Ist Pakistan Congr. Zool;* : 12, 1980 (considered as a synonym of *L. dero*). Sharma and Rajput, *J. Bombay nat. Hist. Soc;* **83(3)**: [1986]; 565, 1987 (Common in Ganga, rare in Ramaganga, Bijnour District, U.P.).

Vernacular Names : *Nepura* : ASSAME: *Kul-ka-batta* : BENGALI; *Mohaylee* : HINDI, *Gid, Giddah* : PUNJABI

Specimens studied : Total six examples, 143.5-220.0 mm in SL.

(1) ZSI F 8471 one example, 56.0 mm in SL; Vender River, Sulaimania, Baluchistan, Zugmayer.

(2) ZSI unregistered three examples, 143.5-158.5 mm in SL; Jhelum river near Srinagar, Kashmir, Zoological survey of India party, 4th june 1954.

(3) ZSI unregistered two examples, 152.0-220.0 mm in SL; Fish-collected from Arpat reserve water for Achabal Trout Hatchery, Kashmir, Zoological Survey of India party, Calcutta, 16th June 1954.

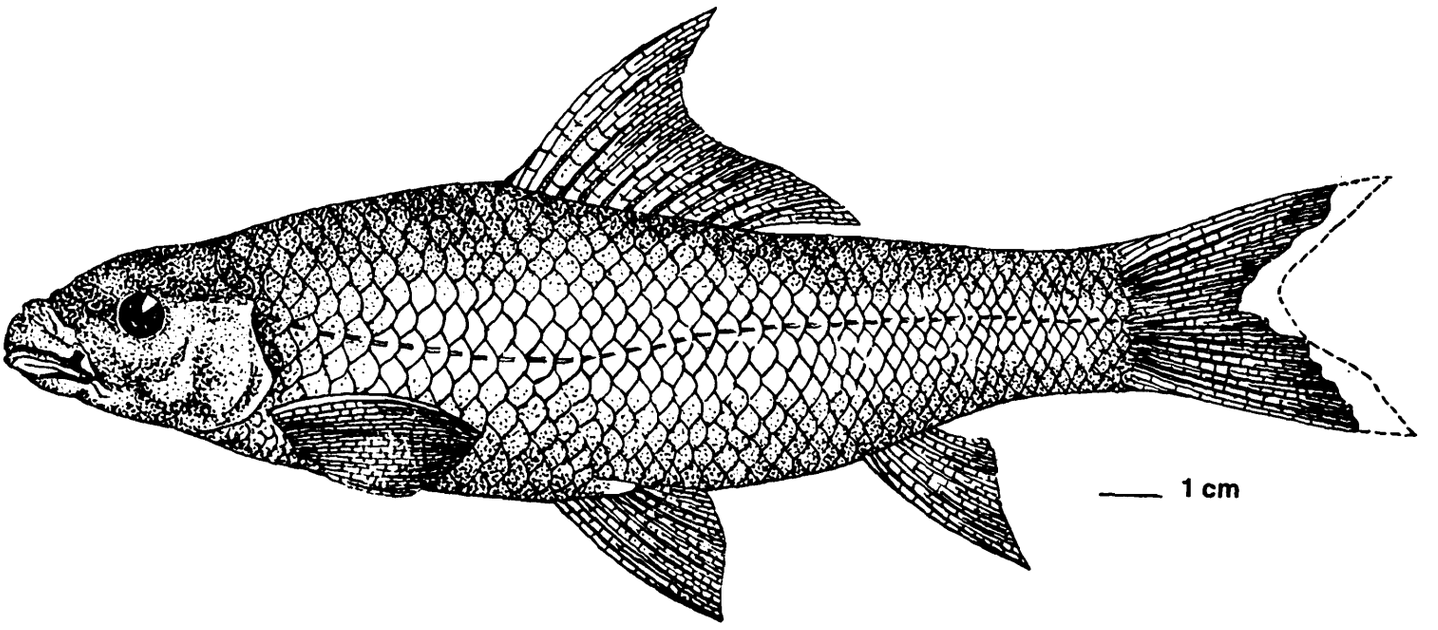

Fig. 9. *Labeo diplostomus* (Heckel)

Diagnosis : A *Labeo* with 12-13 (ii, 10-11) dorsal fin rays; lateral line scales 41-43; between lateral line and dorsal fine base $8^1/_2$-9. Snout with less marked depression; no lateral lobe. Rostral fold overlapping entire breadth of the upper lip.

Description : D. ii, 10-11; P.i.17; V. i, 8;
A. ii, 5; C. 10+9; Ll. 41-43

Dorsal profile gently arched, body depth 27.4 (25.0-29.5), head length 23.1 (21.8-24.4) in percent of standard length. Head long, width 56.8 (50.8- 62.9), height at occiput 68.7 (64.5-72.9), snout length 35.3 (32.5-38.2), width of gape of mouth 33.0 (26.3-39.4), dorsal fin base

79.8 (74.1-85.5), eye diameter 17.4(15.8-18.9) in percent of head length. Eye 50.0 (41.5-58.5) in percent of snout length, 50.2 (46.3-54.0) in percent of interorbital width. One pair of maxillary barbels, small and originating from broad base. Snout without tubercles with gentle depression, rostral folds over entire breadth of the upperlip, continuous at the corner of the mouth. Postlabial groove interrupted.

Dorsal fin inserted nearer to tip of snout than to base of caudal fin, its outer margin concave. Pectoral fin lateraly inserted, not reaching the base of pelvic fin. Pelvic fins originate below the first four or fifth rays of the dorsal and reaching the base of caudal fin. Least depth of caudal peduncle 62.6 (51.2-74.0) on percent of its length. Caudal fin forked. Lateral line curved below the origin of dorsal fin.

Distribution : INDIA : Kashmir, hilly regions of U.P. and Assam. BANGLADESH. PAKISTAN : Sind hills and Baluchistan.

Scales :

Lateral line scales	: 41-43
Predorsal scales	: 14-15
Prepelvic scales	: 10-11
Preanal scales	: 23-24
Dorsal fin/Ll.	: $8^1/_2$-9
Pelvic fin/Ll.	: $7^1/_2$-$8^1/_2$
Anal fin/Ll.	: $7^1/_2$
Circumpeduncular scales	: 24-25

Gill rakers : 5-6/25-26

Size : Maximum : 22.0 cm (S.L).

Colour : When alive, dorsal side blue black or olive green but below the lateral line silvery. Dorsal fin hyaline, all other fin bases hyaline, edged with reddish hue. Scales brownish of pinkish tinge. When preserved in formalin, upper half of the body bluish black, gradually becoming pale towards the belly.

Relationship : This species is allied to *L. dero* (Hamilton), from which it can be distinguished by its rostral fold which covers the entire breadth of the upper lip, not tapering towards the corner of the mouth (vs. in *L. dero* rostral fold tapering towards the corner of the mouth). In *Labeo diplostomus*, both lips are with inner cathilaginous covering but in *Labeo dero*, the lower lip alone has the inner cartilaginous covering with a hard, cutting edge.

Remarks : Day (1878) referred *Varicorhinus diplostomus* (Heckel, 1838) to *Labeo* and included doubtfully *Cyprinus dero* Hamilton. Day was perhaps hesitant to merge it since Hamilton's examples from River Brahmaputra were juveniles and also the description and the figures did not agree. Subsequently, Chaudhuri (1913) referred the fish obtained from Abor hills

as *Labeo diplostomus*. Hora and Mukerji (1936) synonymised *L. diplostomus* under *L. dero* after examining a large series of specimens from Teesta valley and Doon hills. They felt that the difference between *L. dero* and *L. diplostomus* are probably due to the age of the specimens on which the original descriptions were based. Following Hora and Mukerji, Menon (1974) and Mirza (1977 & 1980), Jayaram (1981) Talwar and Jhingran (1991) considered *L. diplostomus* as synonym of *L. dero*.

Hora (1936), however, in a subsequent paper while dealing with fishes from Naga hills discussed elaborately the differences between *L. diplostomus* (= *L. dero*) as given by Day with *L. dyocheilus* but at the end stated that the Kashmir specimen seemed to differ from *L. dero* and *L. devdevi* and that 'they better be kept separate as *L. diplostomus* (Heckel) for the time being' Das and Subla (1964) did however recognize *L. diplostomus* as a separate species from Kashmir. Ataur Rahman (1974) also in his checklist of Bangladesh fishes considered *L. diplostomus* as separate species. Our study also supports the view that the two are distinct.

ADDITIONAL DATA

Table : Non-meristic Characters

Labeo diplostomus (Heckel)

	Ratio	Mean	SD	Percentage	Mean	n
	Range			Range		
SL/Body depth	3.4 4.0	3.6	0.27	25.0 - 29.7	27.7	6
SL/LH	4.1 4.6	4.3	0.18	21.8 - 24.4	23.1	6
SL/Predorsal length	2.2 2.4	2.3	0.05	42.4 - 45.4	43.9	6
SL/Preanal length	1.2 1.3	1.25	0.04	74.6 81.9	78.3	6
SL/Prepelvic length	1.8 2.0	1.9	0.04	50.8 - 54.3	52.5	6
Snout/Eye	1.7 2.4	2.0	0.024	41.5 - 58.5	50.0	6
Iow/Eye	1.8 -. 2.2	2.0	0.10	46.3 - 54.0	50.2	6
LH/Eye	5.1 6.3	5.7	0.38	15.8 - 18.9	17.4	6
LH/Snout	2.6 3.1	2.8	0.16	32.5 - 38.2	35.3	6
LH/Head width	1.6 2.0	1.8	0.15	50.8 - 62.9	56.8	6
LH/HT. at occpt.	1.4 1.6	1.5	0.06	64.5 - 72.9	68.7	6
LH/Width of mouth	2.5 3.8	3.4	0.47	26.3 - 39.7	33.0	6
LH/LCPD	1.2 1.7	1.4	0.11	64.0 - 80.0	72.1	6
LH/HCPD	1.9 2.2	2.1	0.09	45.9 - 51.3	48.6	6
LH/Dorsal fin base	1.2 1.4	1.3	0.06	74.1 - 85.5	79.8	6
LCPD/HCPD	1.3 1.9	1.6	0.25	51.3 - 74.1	62.7	6

Labeo gedrosicus Zugmayer

Labeo gedrosicus Zugmayer, 1912, *Ann. Mag. nat Hist.,* **(8) 10**: 598 (type-locality : Rakhshan river at Panjgur, Baluchistan Pakistan); Mirza, 1972, *Biologia.* **18(2)**: 160.

Tylognathus gedrosicus : Berg, 1949, *Trudy Zool. Inst. Akad. Nauk. SSSR,* **8**: 788.

Vernacular Name : NIL.

Specimen studied : NIL.

Diagnosis : A *Labeo* with 43 scales along the lateral line, $7^1/_2$ rows of scales between lateral lone and pelvic fins, snout without any lateral lobe but with a distinct groove.

Description : D iii, 10; A ii, 6-7; P i, 13; V i, 8

Body elongate and cylindrical. Snout projecting beyond mouth, without a lateral lobe but with a groove across the snout, studded with pores. Eyes small, not visible from underside of head, diameter 7 to 8 times in head length. Mouth moderate; lips continuous, lower lip only fringed; median, transverse and lateral folds to lower lip. Barbels one pair (maxillary), concealed in lateral grooves. Dorsal fin inserted over tip of pectoral fins, considerably anterior to pelvic fins. Pectoral fins about as long as head, extend to pelvic fins. Caudal fin deeply forked. Scales moderate; lateral line with 43 scales; lateral transverse scale rows $7^1/_2$ between lateral line and pelvic fin base.

Colour : In life, greyish-brown, bluish on back; a golden spot on preoeprcle. Fins pale; anterior margin of dorsal fin black.

Distribution : PAKISTAN : endemic to Nashkel river drainage in Baluchistan.

Relationship : This species is allied to *L. diplostomus* but may be distinguished by its smaller eye, the median fold to lower lip, and the covering on the jaws which is found on the lower jaw only. Moreover, the dorsal fin is inserted midway between anout and origin of anal fin. (After Talwar & Jhingran, 1991).

Labeo dyocheilus dyocheilus (McClelland)

(Fig. 10)

Cyprinus dyocheilus McClelland, *Asiat. Res;* **19(2)**: 268, 230, pl.37, fig.1, 1839 (type-locality : Assam). Valenciennes (in Cuvier and Valenciennes), *Hist. nat. Poiss;* **16**: 461, 1842.

Gobio bicolor McClelland, *Asiat. Res;* **19(2)**: 278, 360, pl.40, fig.1, 1839 (type-locality : North-west Provinces and Assam; North West Provinces an error). Valenciennes (in Cuvier and Valenciennes). *Hist. nat. Poiss;* **16**: 462, 1842.

Cirrhina dyochelus,-Gunther, *Cat. Fish. Brit. Mus.* **7**: 37, 1868 (Assam).

Cirrhina dyochilus Beavan, *HBk. FW. Fish. India,* : 68, 1877 (clear streams of Assam and Cachar).

Labeo dyochelus, Day, *Fish. India,* : 535, 540, pl.130, fig.1, 1877 (Sind hills, along Himalayas to Sikkim and Assam; Sind hills an error). Chaudhuri. *Rec. Indian Mus;* **6**: 15, 1911 (resembling *L. yuannansis*). Chaudhuri, *Rec. Indian Mus;* **8**: 243, 1913 (Abor hills). Hora, *J. Asiat. Soc. Beng;* **22(3)** [1926]: 124, 1927 (Manuscript drawing of Alexander Burnes). Hora, *Rec. Indian Mus;* **38(3)**: 320, 1936 (Naga hills). Hora, *Rec. Indian Mus;* **39(1)**: 44, 1937 (Nepal, Simla, Hardwar, Assam). Shaw and Shebbeare, *J. Asiat. Soc. Beng;* **3**: 53, text-fig. 50, 1937 (North Bengal). Hora and Gupta, *J. Asiat. Soc. Beng;* **6(2)**: 79, 1941 (Kalimpong Duars and Siliguri Terai, Northern Bengal). Hora and Nair, *Proc. nat. Inst. Sci. India,* **10(1)**: 155, 1944 (Rungbee and Ryanag rivers, Darjeeling District, North Bengal). Menon, *J. Bombay nat. Hist. Soc;* **48(3)**: 539, 1949 (River Kosi, Kumaon). Menon, *Rec. Indian Mus;* **47(2)**: 233 1949 (River Kosi, Chhatra bazar, Eastern Nepal). Job, David and Motwani, *J. Asiat. Soc. Beng;* **18(2)**: 168, 1952 (upper parts of Barakar, Konar and Damodar). Silas, *Proc. nat. Inst. Sci. India,* **18(5)**: 425, 1952 (distribution). Job, David and Das, *Indian J. fish;* **2(1)**: 33, 1955 (Hirakud Dam). Motwani and David, *J. Zool. Soc. India,* **9(1)**: 11, 1957 (river Sone). Dewitt, *Stanford Ichth. Bull;* **7(4)**: 76, 84, 1960 (Nepal). Motwani, Jayaram and Sehgal, *Trop. Ecol;* **3(1&2)**: 17, 1962 (Brahmaputra river system, Assam). Menon, *J. Zool. Soc. India,* **14(1)**: 27, 1963 (Brahmaputra, Kosi, Bagmati and Gandak; Rapti, Karnali and Kali; Ramganga, Ganges and Jumna and Indus drainages). Lal and Chatterjee, *J. zool. Soc. India,* **14(2)**: 234, 235, 237, 241, 1963 (Eastern Doon). Tandon and Thind, *Res. Bull. Punjab. Univ;* **14(1-2)**: 163, 1963 (Black Bein, Punjab). Das and Subla, *Icthyologica,* **3(1-2)**: 86-92, 1964 (Doon valley). Tandon and Sharma, *Res. Bull. Punjab Univ;* **16(4)**: 335, 1965 (River Ghaggar). Mahajan, *J. Bombay. nat. Hist. Soc;* **62(3)**: 448, 1966 (Muzaffarnagar District, U.P.). Tandon and Dhawan, *Res. Bull. Punjab Univ;* **18(1-2)**: 56, 1967 (Budha-nalla, Punjab). Dhingara and Vasisht, *Res. Bull. Punjab Univ;* **18(3-4)**: 511, 1967 (Hoshiarpur District, Punjab). Tilak, *Rec. zool. Surv. India,* **65(1-4)**: 186, 195, 1967 (River Tawi at Jammu). Grover, *G.K. Vishwa J. Sci. Res;* **2**: 116, 1970 (Song river, Doon valley, U.P.). Pant, *Rec. zool. Surv. India,* **64(1-4)**: 88, 1970 (Kumaon Himalayas). Datta and Majumdar, *Rec. zool. surv. India,* **62(1&2)**: 82, 1970 (Rajasthan). Das and Nath, *Kashmir Sci;* **8(1&2)**; 21, 1971 (Kashmir valley). Seghal, Shukla and Shaw, *J. Inland Fish. Soc. India,* **3**: 67, 69, 70, 1971 (Kangra valley). Tilak, *Rec. zool. Surv. India,* **65(1-4)**: 278, 1972 (Sikkim). Tilak, *Cheetal,* **15(4)**: 36, 1973 (North Bengal). Bhatnagar, *J. Inland Fish. Soc. India,* **5**: 135, 1973 (Bhakra reservoir). Motwani and Saigal, *Indian J. Fish;* **2(1)**: 109, 1974 (Sarda reservoir, Pilibhit, U.P.). Seghal, *J. Bombay nat. Hist. Soc;* **70(3)**: 466, 470, 1974 (Bilaspur). Ataur Rahman, *Bangladesh J. Sci. Ind. Res;* **9(3&4)**: 200, 1974 (name only, checklist of Bangladesh fishes, Bengali names). Badola, *Indian J. zool;* **16(1)**: 60, 62, 1975 (Pauri-Garhwal). Tandon and Gupta, *J. Zool. Soc. India,* **27(1-2)**: 20, 1975 (Ferozepur District, Punjab). Ataur Rahmán, *Bull. Fw. Fish. Res. Sta;* **(1)**: 7, 1975 (name only, checklist of Bangladesh fishes, Bengali names). Srivastava and Venkateswarlu, *Indian J. zool;* **17(3)**: 180, 1976 (name only, list of fishes from Uttar Pradesh, with local names, Garhwal Kumaon). Grover and Gupta, *Proc. nat. Acad. Sci. India,* **47B(4)**: 207, 211, 1977 (Banda District, U.P.). Tilak and Husain, *Zool. Jb. Syst;* **104**: 267, 277, 296, 1977 (Bhakra reservoir, Bilaspur, H.P.). Johal and Tandon, *Pb. fish. Bull;* **3(2)**: 10, 1979 (synonymy, East Punjab). Tilak and Sinha, *Zool. Jb. syst;* **104**: 179, 187, 1979 (Madhya Pradesh). Johal and Dhillon, *Res. Bull. Punjab Univ;* **32**: 105, 1981 (Ganganagar

District, Rajasthan). Johal and Tandon, *Res. Bull. Punjab Univ;* **32**: 146, 1981 (Punjab). Singh and Badola, *Proc. nat. Acad. Sci. India,* **51(B)**: 135, 1981 (River Alaknanda, Garhwal, U.P.). Shrestha, *Fish, Nepal,* p.73, fig. 1981 (Nepal). Sharma and Kulshretha, *J. zool. Soc. India,* **33(1-2)**: 65, 1982 (Kota District, Rajasthan). Sharma and Grover, *An introduction to Indian Fish;* p.31, 1982 (Hilly regions). Singh, Badola and Dobriyal, *J. Bombay nat. Hist. Soc;* **84(1)**: 127, 1987 (Garhwal-Himalayan rivers). Talwar and Jhingran, *Inland Fish;* **1**: 207, 1991 (Pakistan : Sind hills; India : all along Himalayas, Assam and also in Mahanadi and Damodar rivers. Bangladesh, Nepal).

Labeo dyochilus, Day, *Fauna Brit. Ind. Fish;* **1**: 257, 266, 1989 (Sind hills, all along Himalayas to Sikkim and Assam; Sind hills excluded). Khan, *J. Bombay nat. Hist. Soc;* **37(3)**: 657, 1934 (Punjab).

Labeo kunki Chaudhuri, *Rec. Indian Mus;* **7**: 438, pl.38, fig.3 1912 (type-locality : Gandak, Saran, Bihar).

Labeo tezpuransis Chaudhuri, *Rec. Indian Mus;* **7**: 439 pl.39, fig.1, 1a, 1b 1912 (type-locality : Belsiri river, Tezpur, Assam).

Labeo (Labeo) dyocheilus, Mukerji, *J. Bombay nat Hist. Soc;* **37(1)**: 55, 1934 (Hardwar and Simla).

Labeo dyocheilus dyocheilus, Jayaram, *HBk. FW. Fish. India,* : 117, 1981 (key to species).

Vernacular Names : *Heel-gorya. Lasu* : ASSAME; *Boalla, Buteal, Dhai, Kunni, Torki* : HINDI; *Gharuch* : ORIYA; *Konni, Konti* : PUNJABI.

Specimens studied : Total 22 examples, 68.0-321.50 mm in SL.

(1) ZSI F 4624 one example, 110.0 mm in SL; Gandak river, Saran, Bihar. D.D. Mukerji, October 1909.

(2) ZSI F 4864 one example, 95.0 mm in SL; Uttar Pradesh. Hodgart, 2nd March 1910.

(3) ZSI F 5356 one example, 106.0 mm in SL; Sripur, Saran District, Bihar. D.D. Mukerji, September 1910.

(4) ZSI unregistered three examples, 110.0-148.0 mm in SL; Lilifare Market, Santhal Parganas, Bihar. 31st October 1938.

(5) ZSI F 2279 one example, 81.50 mm in SL; river Tribeni, Terai Nepal, 1949.

(6) ZSI F 1809 three examples, 117.0-138.0 mm in SL; Asna river Shabbawala Baronjan. Indo-German expedition team, 23rd September 1956.

(7) ZSI F 4608 nine examples, 68.0-214.5 mm in SL; River Tawi, 2 miles down stream from Nagrota, Jammu District, Jammu and Kashmir. Tilak, 28th October 1964.

(8) SRS/ZSI unregistered two examples, 282.50-321.50 mm in SL; River Cauvery at Rajmanal, 16 km from Hogganekkal Falls, Dharmapuri District, Tamil Nadu. A.G.K. Menon and party, 18th January 1991.

(9) SRS/ZSI unregistered one example, 82.0 mm in SL; river Cauvery near Trichy, Tamil Nadu. K.V. Lakshminarayana and party, 19th February 1991.

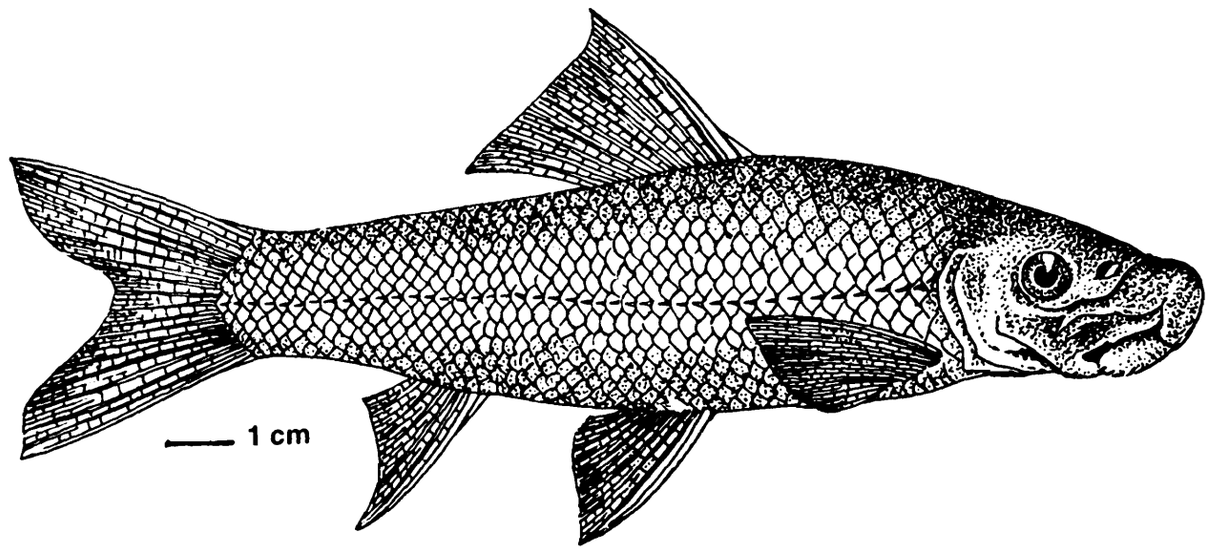

Fig. 10. *Labeo dyocheilus dyocheilus* (McClelland)

Diagnosis : A *Labeo* with 11-13 (ii or iii, 9-10) dorsal fin rays; 40-43 scales on lateral line. $5^1/_2$- $6^1/_2$ rows of scales between pelvic fin and lateral line. Snout blunt, rostral fold thick, often with a depression arising from below both eyes and joining at the middle of snout. Snout often coarse with horny tubercles in both male and female.

Description : D. ii or iii, 9-10; P. i 14-16; V. i, 8;
A. ii, 5; C. 10+9; Ll. 40-43.

Dorsal prolific gently arched, body depth 26.4 (23.0-30.4) head length 26.2 (20.9-29.4) in percent of standard length. Head moderate, width 59.5 (50.0-69.9), height at occiput 72.9 (62.1-82.6), snout length 43.4 (34.2-55.2), width of gape of mouth 35.7 (26.2-42.5), dorsal fin base 70.4 (55.5-82.6), eye diameter 23.4 (16.2-33.3) in percent of head length. Eye 78.1 (29.5-86.2) in percent of snout length, 55.5 (30.9-90.9) in percent of interorbital width. One pair of maxillary barbels hidden in the lateral groove. Snout obtuse, with lateral lobe, covered with horny tubercles. Rostral fold also with tubercles. A lateral depression arises from below both eyes and join in the middle of the snout, which is more prominent in mature males than females. Both lips very fleshy, continuous at the corner of the mouth. Dorsal side of lower lip has striations; A thick cartilaginous covering to both lips. Postlabial groove interrupted.

Dorsal fin inserted nearer to tip of snout than base of caudal fin. Pectoral fins inserted laterally, not reaching base of pelvic fin which arises below the fourth or fifth rays of the dorsal fin and does not reach the anal fin which when laid flat reaches base of the caudal fin. Caudal fin forked; least depth of caudal peduncle 75.7 (60.2-90.9) in percent of its length. Lateral line straight.

Distribution : INDIA : Throughout except Kerala. BANGLADESH and NEPAL.

Scales :

Lateral line scales	: 40-43
Predorsal scale	: 12-14
Prepelvic scales	: 10-12
Preanal scales	: 24-27
Dorsal fin/Ll.	: $7^1/_2$-$8^1/_2$
Pelvic fin/Ll.	: $5^1/_2$-$6^1/_2$
Anal fin/Ll.	: $5^1/_2$-$6^1/_2$
Circumpeduncular scales	: 19-23

Gill rakers : 5-6/26-39

Size : Maximum : 90.0 cm (T.L)

Colour : When alive, the upper half of the body is olive green which becomes silvery in the belly region. Dorsal fin hyaline. When preserved in formalin, body becomes dark greyish; pectoral and pelvic fins with reddish tinge which becomes slaty.

Relationship : This species has greater resemblance to *L. dero*; but it can be distinguished from it in having an obtuse snout, a lateral depression below the eye, and the rostral fold with tubercles in the adult. Snout is with a lateral fold (vs in *L. dero*, snout conical, without a lateral fold). Scales between pelvic fin and lateral line $5^1/_2$-$6^1/_2$ (vs $6^1/_2$-$7^1/_2$). Dorsal region of lower lip with striations (vs in *L. dero* papillated).

Remarks : McClelland (1839) described the above species under the name *Cyprinus dyocheilus* from specimens collected from the Brahmaputra, in Assam. The description and figure given are zoologically poor and the determination of the fish to its exact identity was difficult. He named the fish as *'dyocheilus'* because of the "pendulous structure of the snout descending so as to form the appearance of a second lip" Day (1878) referred the fish as *Labeo dyocheilus* and gave a general account but his figure of (Pl. 130, Fig.1) is poor. He (1889) gave its distribution as Sind hills along the Himalayas, Sikkim and Assam, but common in Assam. Mukerji (1934) reporting upon two fish collections made by Lt. Col. R.W. Burton from the

tributary stream of the MaliHka, Myitkyina District, Burma, considered *Labeo dyocheilus* as a very variable species and divided it into three geographical groups based on their distribution. Besides the five specimens (42 to 200 mm) of Burton's collections from MaliHka, Mukerji examined three specimens present in the ZSI, two of which were Day's and the third, a skin of medium size specimen procured by S.W. Kemp from Yembung, Abor country (Arunachal Pradesh) which Chaudhuri (1913) also reported. Of the two specimens of Day, one (ZSI, 1522) is from Hardwar and another (ZSI, 1523) is from Shimla, (126.0 mm) and (320.00 mm) respectively. In the opinion of Mukerji, the two specimens of Day from Hardwar and Shimla did not represent *L. dyocheilus* and the only skin from Abor country collected by S.W. Kemp is the typical *L. dyocheilus*. He described the species based not only on the single skin collected by S.W. Kemp from Abor country but also from two additional specimens collected from Eastern Himalayas. Further, he clearly stated that the Burma and Thailand forms and the Western Himalayan forms belong to different groups.

Hora (1936) in dealing with the fishes from the Naga hills re-examined all the material cited by Mukerji and opined that the two examples (ZSI F 1522 and ZSI F 1523) from Hardwar and Shimla respectively are readily referable to *L. dyocheilus* and that the so called typical example of *L. dyocheilus* from Abor country collected by Kemp and also the five examples of Burton MaliHka, Burma are not *L. dyocheilus* as concluded by Mukerji, but they are *L. dero* (Hamilton).

Hora (*op. cit.*) demonstrated that *L. dero* is more common and widely distributed than *L. dyocheilus* and that in *L. dero* the dorsal surface of the lower lip is studded with large number of papillae, whereas in *L. dyocheilus* there is a series of ridges. This difference in lip structure is noticeable both in the young and adult examples of both species. However, Hora segregated the two Burmese and Thailand material as *L. devdevi*. Jayaram and Das (1980) re-examined the above material and gave their interpretation. They clarified the confusion in respect of *L. dero* and *L. dyocheilus* and redescribed *L. devdevi* with figure.

Thus it is clear that *L. dero* and *L. dyocheilus* are clearly distinguishable and *L. devdevi* from Burma = Myanmar is altogether a distinct species though related to the above.

Chaudhuri (1912) described two new species *L. tezpurensis* and *L. kunki* from North India. Based on examination of these specimens (Holotypes), we now consider them as synonyms of *L. dyocheilus dyocheilus*.

ADDITIONAL DATA

Table : Non-meristic Characters

Labeo dyocheilus dyocheilus (McClelland)

	Ratio	Mean	SD	Percentage	Mean	n
	Range			Range		
SL/Body depth	3.2 4.3	3.7	0.32	23.0 - 30.4	26.4	22
SL/LH	3.4 4.7	3.8	0.36	20.9 - 29.4	26.3	22
SL/Predorsal length	1.9 2.3	2.1	0.10	43.4 - 51.5	46.9	22
SL/Preanal length	1.1 1.3	1.2	0.03	75.1 84.0	78.1	22
SL/Prepelvic length	1.6 2.0	1.8	0.11	49.0 62.5	53.1	22
Snout/Eye	1.1 3.3	2.2	0.03	29.5 86.2	78.1	22
Iow/Eye	1.1 3.2	1.9	0.50	30.9 - 90.9	55.5	22
LH/Eye	3.0 6.1	4.2	0.73	16.2 - 33.3	23.4	22
LH/Snout	1.8 - 2.9	2.3	0.27	24.2 - 55.2	43.4	22
LH/Head width	1.4 2.0	1.6	0.24	50.0 - 69.9	59.5	22
LH/HT. at occpt.	1.2 1.6	1.3	0.26	62.1 82.6	72.9	22
LH/Width of mouth	2.3 3.7	2.8	0.44	26.6 42.5	35.7	22
LH/LCPD	1.3 2.1	1.5	0.32	47.6 - 74.6	64.5	22
LH/HCPD	1.5 - 2.9	2.1	0.31	34.4 - 63.6	46.5	22
LH/Dorsal fin base	1.2 1.8	1.4	0.14	55.5 82.6	70.4	22
LCPD/HCPD	1.1 1.6	1.3	0.14	60.2 - 90.9	75.7	22

Labeo microphthalmus Day

(Fig. 11)

Labeo microphthalmus Day, *Fish. India,* : 542, pl.132, fig.4, 1877 (type-locality : Muree, Pakistan). Day, *Fauna. Brit. Ind. Fish;* **1**: 268 1889 (Himalayas, Punjab, Muree, Kangra and Kashmir). Nazir Ahmad, *Bull. Punjab Univ. Dept. Zool;* **1**: 274, fig.3, 1943 (description, River Ravi, Lahore). Mirza, *Biologia,* **16(2)**: 79, fig., 1970 (River Ravi, Lahore). Islam and Siddiqui, *Biologia.* **17(1)**: 31, 1971 (river Jhelum near Chak Dolat, Pakistan). Das and Nath, *Kashmir Sci;* **8(1&2)**: 3 (Tawi river in Jammu, Jajar nallah, altitude 1000-1500 ft.); 5, 1971 (brief description, presence in Kashmir valley not confirmed). Mirza, *Biologia,* **20(1)**: 78, 1974 (name only, distribution in Indus plain of Pakistan). Mirza, *Bijdr. Dierk;* **45(2)**: 173, 1975 (distribution in Pakistan, Indus Plain, Salt range and Kohat hills). Mirza, *Biologia,* **22(1)**: 116, 1976 (name only, list of fishes from Northern Montane and Submontane regions of Pakistan with common names). Johal and Tandon, *Pb. fish. Bull;* **3(2)**: 12, 1979 (brief description, East Punjab).

Mirza. *Proc. Ist. Pakistan Congr. Zool;* : 12, 1980 (considered synonym of *L. dero*). Jayaram, *HBk. FW. Fish. India,* p.119, 1981 (key to species). Mirza, *Fish. Lahore,* : 9, 1982 (colour and distribution). Talwar and Jhingran, *Inland Fish;* **1**: 214, 1991 (Western Himalayas).

Vernacular Names : Bhangan : URUDU.

Specimen studied : Nil

Diagnosis : A *Labeo* with 13 (iii, 10) dorsal fin rays; lateral line scales 41-43. Snout with or without groove; eye relatively small.

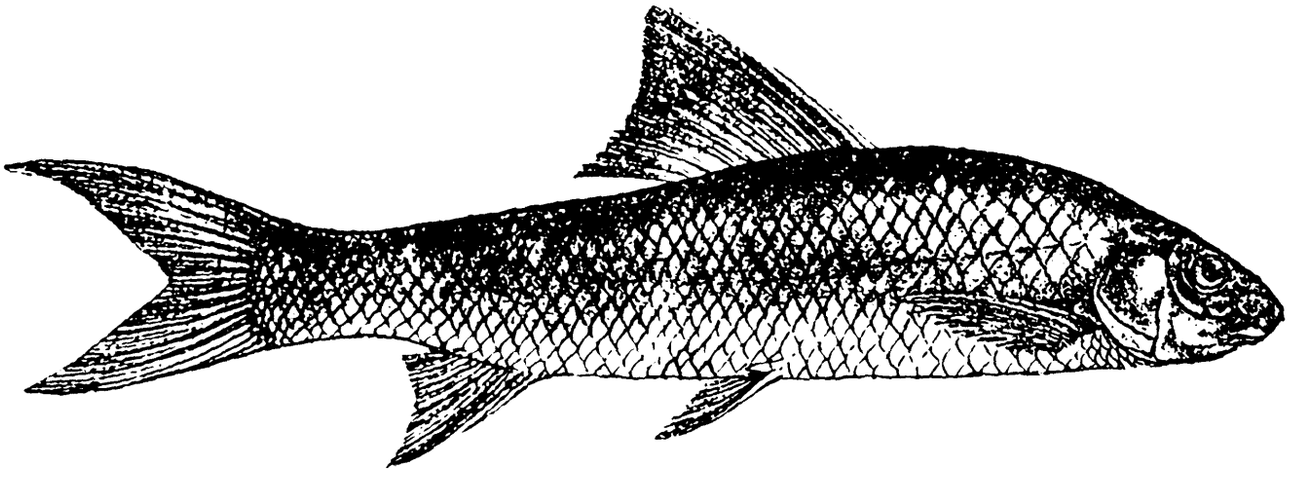

Fig. 11. *Labeo microphthalmus* Day

Description : (After Ahmad, 1943) D. iii, 10; P. i, 17; V. i, 8;
A. iii, 5; C. 10+9; Ll. 41-43.

Dorsal profile more convex than abdomen, body deepest, its depth 21.7-28.6, head length 21.7-25.0 in percent of standard length 21.7-25.0 in percent of standard length. Head small, width 66.6, eye diameter 24.3-25.6, width of mouth 28.6-30.3 in percent of head length. Eye situated almost in anterior half of head, 52.6 in percnt of snout length. Snout with pores and without any groove. Mouth inferior; lower jaw with horny or cartilaginous covering. Postlabial groove interrupted. A pair of short maxillary barbels.

Dorsal fin inserted almost midway between end of snout and base of caudal. Upper margin of dorsal fin concave. Pectoral fin not reaching pelvic fin which does not reach anal fin when laid flat. Anal fin does not extend to base of caudal. Caudal fin deeply forked. Least depth of caudal peduncle 66.6-90.9 in percent of its length.

Distribution : PAKISTAN. INDIA : Western Himalayas.

Scales :

Lateral line scales	: 41-43
Dorsal fin/Ll.	: 8
Pelvic fin/Ll.	: $6^1/_2$
Circumpeduncular scales	: 22

Size : Maximum : 45.0 cm (TL) (Ahmad, 1943)

Colour : Silvery, darkest in the upper half of body; sometimes the scales are marked with red.

Relationship : This species is closely related to *L. dero* (Hamilton) differing from it as follows : Both have pores on the snout, but *L. microphthalmus* does not have a depression on the snout and *L. dero* has horny tubercles. Scales between lateral line and pelvic fin $6^1/_2$ (vs $6^1/_2$-$7^1/_2$ in *L. dero*); circumpeduncular scales 22 (vs 22-24 in *L. dero*). Colour : silvery, darkest in the upper half of the body (vs olive green in the dorsal region of the body).

Remarks : Day (1878) described this species from specimens collected by Lt. Beavan from Muree, West Pakistan but named it as *L. diplostomus*. No description of *L. dero* was given by Day either in his Fish. India or Fauna of India (1889).

L. microphthalmus does not appear to be common as seen from literature subsequent to Day 1889. Hora who did extensive studies on Indian fishes has not recorded the species in any of his 438 papers (1920-1951) as verified from Index Horana of Jayaram (1976). Ahmad (1943) recorded this species from River Ravi, Lahore which Mirza (1970) confirmed. Islam and Siddqui (1971), Mirza (1974, 1975, 1976, 1982) recorded it from various localities in West Punjab (Pakistan). Menon (1974) synonymised this species under *Labeo dero* without assigning any reason, which Mirza (1980) adopted. *L. dero* is distinct and is common in plains and Himalayan foot hills and even in peninsula of India, besides Pakistan, Nepal, Bangladesh and Myanmar.

L. microphthalmus is mainly a species of Western Pakistan and is an inhabitant of Montane and Submontane regions.

Labeo devdevi Hora

(Fig. 12)

Labeo devdevi Hora, *Rec. Indian Mus;* **38**: 323, 1936 (type-locality : Mali Hka river, Upper Burma). Hora, *Rec. Indian Mus;* **39**: 331 (Namya river at Kongan Thana). Hora and Misra, *J. Bombay nat. Hist. Soc;* **41(3)**: 479, : 1, 1941 (Dalu, upper Chindwin drainage). Menon *J. zool. Soc. India,* **14(1)**: 27, 1962 (Chindwin drainage). Jayaram and Das, *Bull, zool. Surv. India* **2(2&3)**: 203, fig., 1980 (status discussed). Jayaram, *HBk. FW. Fish. India,* : 121, 1981 (key to species). Talwar and Jhingran, *Inland Fish;* **1**: 205,

1991 (Burma and Thailand).

Vernacular Names : *Ngalu* : KABO; *Ngachutan* : KUKI, *Ngatin macha* : MANIPURI

Specimens studied : Total six examples, 31.0-191.0 mm in SL.

(1) ZSI F 1442 two examples, 185.0-191.0 mm in SL; Phyngin HKa, tributary of Mali Hka river system, Burma. R.W.Burton, 1930.

(2) ZSI F 13458 four examples, 31.0-36.0 mm in Sl; Dhalu, Upper Burma. Vernay-Hopwood Upper Chindwin Expedition party, 1935.

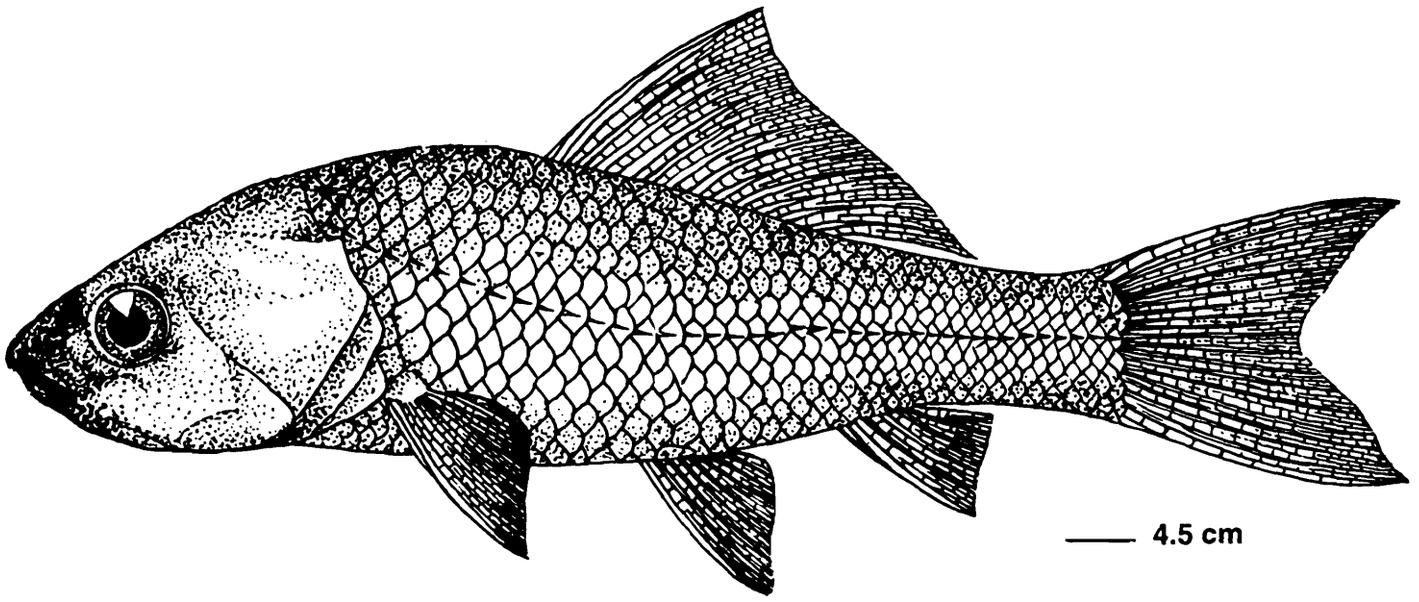

Fig. 12. *Labeo devdevi* Hora

Diagnosis : A *Labeo* species with relatively larger eyes, shorter snout; 40 or 41 lateral line scales and 19-21 scales around caudal peduncle; snout with few small inconspicuous tubercles and without any lateral lobe.

Description : D. ii, 12; P. i, 15; V. i. 8;
A. ii, 5; C. 10+9; Ll 40-41.

Dorsal profile gently arched, body depth 26.8 (25.2-27.8); head length 27.3 (20.8-33.8) in percent of standard length. Head small, width 55.1 (47.6-62.5), height at occiput 78.9 (72.9-84.7) snout length 37.6 (36.2-38.9), width of gape of mouth 31.8 (23.2-40.3), dorsal fin base 86.7 (66.7-106.7), eye diameter 25.8 (22.9-28.6) in percent of head length. Eye 69.4 (63.7-75.2) in percent of snout length, 67.9 (57.8-78.2) in percent of interorbital width. Snout blunt, with

a slight depression across. Mouth inferior, large and crescentic. Lips thick, fleshy, continuous at angle of the mouth; lower lip papillated; labial fold not continuous; lower jaw with a cartilaginous covering. Eyes large, situated in the anterior half of the head. Nostrils wide, prominent. One pair of small maxillary barbels at the angle of mouth.

Dorsal fin inserted above just behind the tip of the pectoral fin, nearer to tip of snout than caudal fin base, outer margin concave. Pectoral, pelvic and anal fins long. Pectoral fin not reaching pelvic fin, latter does not reach anal fin which does not reach caudal fin when laid flat. Least depth of caudal peduncle 75.0 (66.7-83.3) in percent of its length. Caudal fin forked.

Distribution : MYANMAR : Phungin HKa and Sian HKa, tributaries of Mali HKa river system; Namya river and Dalu river. THAILAND : Stream at Mehsord, North West Thailand.

Scales :

Lateral line scales	: 40-41
Predorsal scales	: 17-18
Prepelvic scales	: 10-12
Preanal scales	: 23-24
Dorsal fin/Ll.	: 7-8
Pelvic fin/Ll.	: $5^1/_2$-$6^1/_2$
Anal fin/Ll.	: $5^1/_2$-$6^1/_2$
Circumpeduncular scales	: 19-21

Gill rakers : 4-8/26-28

Size Maximum : 19.0 cm (SL).

Colour : Dark olive green on the upper side and gradually becoming pale on the ventral side. Scales with a copper tinge.

Relationship : This species is vey much allied to *Labeo dero* (Hamilton) with some differences in snout which often has inconspicous small tubercles; snout shorter than that of *L. dero*. Scales between pelvic fin and Ll. $5^1/_2$-$6^1/_2$ in *L. devdevi* (vs $6^1/_2$-$7^1/_2$ in *L. dero*).

Remarks : Subsequent to Hora and Misra's (1941) report of juveniles of *L. devdevi* from upper Chindwin, no report seems to have been made of this species.

ADDITIONAL DATA

Table : Non-meristic Characters

Labeo devdevi Hora

	Ratio Range	Mean	SD	Percentage Range	Mean	n
SL/Body depth	3.6 3.9	3.8	0.28	25.2 - 27.8	26.8	6
SL/LH	2.9 4.8	3.9	0.29	20.8 - 33.8	27.3	6
SL/Predorsal length	2.0 2.3	2.2	0.05	42.3 - 50.0	46.6	6
SL/Preanal length	1.2 1.4	1.3	0.04	72.5 - 80.1	76.3	6
SL/Prepelvic length	1.7 2.1	1.9	0.05	47.8 - 57.1	52.5	6
Snout/Eye	1.3 1.6	1.5	0.01	63.7 - 75.2	69.4	6
Iow/Eye	1.3 1.7	1.5	0.11	57.8 - 78.2	67.9	6
LH/Eye	3.5 4.4	4.0	0.18	29.9 - 28.6	25.8	6
LH/Snout	2.6 2.8	2.7	0.17	36.2 - 38.9	37.6	6
LH/Head width	1.7 2.1	1.9	0.25	47.6 - 62.5	55.1	6
LH/HT. at occpt.	1.2 1.4	1.3	0.06	72.9 - 84.7	78.9	6
LH/Width of mouth	2.5 3.7	3.1	0.21	23.2 - 40.3	31.8	6
LH/LCPD	1.2 2.2	1.7	0.04	45.4 - 82.2	65.8	6
LH/HCPD	1.8 3.0	2.4	0.03	33.3 - 58.5	45.9	6
LH/Dorsal fin base	0.9 1.6	1.3	1.08	66.7 - 106.7	86.7	6
LCPD/HCPD	1.2 1.5	1.3	0.12	66.7 - 83.3	75.0	6

Labeo dyocheilus pakistanicus Mirza & Awan

(Fig. 13)

Labeo dyocheilus pakistanicus Mirza and Awan, *Biologia,* **22(1)**: : 43, fig.2, 1976 (type-locality : Qadh Wala Stream, Son-Sakesar valley, Pakistan). Mirza, *Biologia,* **22(1)**: 116, 1976 (name only, list of fish from Northern Montane and Submontane regions of Pakistan with common names). Siddiqi and Mirza, *Pakistan J. zool;* **10(2)**: 299, 1978 (Drahma, 16 km east of Dera Akazikhan; Shonia Canal, Muffan Division, Pakistan). Mirza, *Proc. Ist Pakistan Congr. Zool;* p.13, 1980 (name only, distribution in Pakistan and elsewhere, original name and Day's equivalent given). Jayaram *HBk. Fw. Fish. India,* : 117, 1981 (distribution only). Lone, *Inland Fish. Aquacult. Pakistan,* p.43, 1983 (name only, distribution in Pakistan and elsewhere). Mirza and Omer, *Biologia,* **30(1)**: 79, 1984.(distribution only). Mirza and Abubakr, *Biologia,* **34(1)**: 46, 1988 (Chasma Lake, Mianwala District, Pakistan). Mirza and Javed Khan, *Biologia,* **34(1)**: 152, 1988 (Marala river, Chenab, Sialkot District, Pakistan).

Vernacular Names : Nil

Specimen studied : Nil

Diagnosis : A *Labeo* with 13 (iii, 10) dorsal fin rays. Lateral line scales 40-42; $8^1/_2$ scales between lateral line and base of dorsal fin; $6^1/_2$-$7^1/_2$ between base of pelvic fin and lateral line; 15 scales on predorsal.

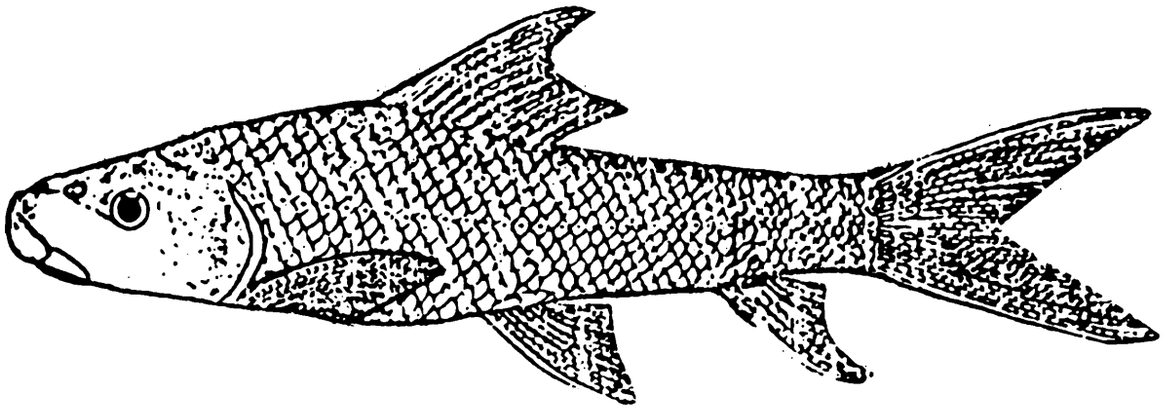

Fig. 13. *Labeo dyocheilus pakistanicus* Mirza & Awan

Description : (After Mirza and Awan, 1976). D. iii, 10; P. i. 14; V. i. 8; A. ii, 5; C. 10+9; Ll. 40-42.

Dorsal profile gently arched, deepest in front of dorsal fin, body depth 22.7 (20.8-25.6), head length 25.6 (24.3-26.3) in percent of standard length. Head moderate, width 62.5 (58.8-66.7) height at occiput 75.7 (71.4-76.9), snout length 52.34 (50.0-58.2), width of gape of mouth 38.4 (37.0-47.6), dorsal fin base 71.4 (62.5-76.9), eye diameter 20.8 (18.5-22.7) in percent of head length. Eye 40.0 (35.7-45.5) in percent of snout length, 43.4 (38.4-50.0) in percent of inter-orbital width. Mouth interior, fairly large, cresentic, extending up to the level of nostrils. A fleshy fold present, fimbriated at free edge, hanging upon the upper lip forming rostral lobe on either side. Lower lip greatly fringed and covered with papillae. Postlabial groove not continuous. barbels very small, present at the angle of mouth.

Origin of dorsal before pelvic fin and almost equidistant between the tip of snout and base of caudal. Pectoral fin pointed, shorter than the head. Pelvic fin may not be reaching anal opening. Anal fin reaching caudal base in some specimens. Caudal fin deeply forked. Least depth of caudal peduncle 66.7 (58.8-76.9) in percent of it length.

Distribution : PAKISTAN : Montane and Submontane areas, Qadh Wala Stream, .Sonsakesar valley and Azad Kashmir. AFGHANISTAN : Kabul river.

Scales :

Lateral line scales : 40-42
Predorsal scales : 15
Dorsal fin/Ll. : $8^{1}/_{2}$
Pelvic fin/Ll. : $6^{1}/_{2}$-$7^{1}/_{2}$

Size : Maximum 164.0 mm (TL)

Colour : When preserved, dark brown on dorsal and lateral side above the lateral line, yellowish pink below. Operculum with a large oblique black blotch. A block spot present at the base of caudal. Anterior edge of dorsal fin grey. All the rays of caudal and dorsal fins black, blask pigment dispersed in the membrane between the rays of pectoral, pelvic and anal fins which are yellowish pink.

Relationship : This species is closely related to *L. dyocheilus dyocheilus* (McClelland).

Remarks : Mirza and Awan (1976) stated that *L. dyocheilus dyocheilus* has 12 branched fin rays. But the present study shows only 9 or 10 branched rays. Coad (1981) reported *L. dyocheilus* (McClelland) from Kabul river, Afghanistan. It might be *L. dyocheilus pakistanicus* as this subspecies range begins from Azad Kashmir and goes beyond the frontier of Pakistan in the west.

Table for meristic characters (on p. 136) is not given as many characters have been presented from Mirza and Awan (1976).

ADDITIONAL DATA

Table : Non-meristic Characters

Labeo dyocheilus pakistanicus Mirza & Awan

	Ratio	Mean	SD	Percentage	Mean	n
	Range			Range		
SL/Body depth	3.9 4.8	4.4	0.31	20.8 - 25.6	22.7	7
SL/LH	3.8 4.1	3.9	0.10	24.3 26.3	25.6	7
SL/Predorsal length	2.2 2.3	2.25	0.04	43.4 - 76.9	44.4	7
SL/Preanal length	1.3 1.4	1.31	0.03	71.4 76.9	46.3	7
SL/Prepelvic length	3.7 4.7	4.3	0.32	21.2 - 27.0	23.2	7
Snout/Eye	2.2 2.8	2.5	0.16	35.7 45.4	40.0	7
Iow/Eye	2.0 - 2.6	2.3	0.18	38.4 - 50.0	43.4	7
LH/Eye	4.4 - 5.4	4.8	0.32	18.5 - 22.7	20.8	7
LH/Snout	1.7 2.0	1.9	0.09	50.0 - 58.2	52.3	7
LH/Head width	1.5 1.7	1.6	0.05	58.8 - 77.7	62.5	7
LH/HT. at occpt.	1.3 1.4	1.32	0.40	71.4 - 76.9	75.7	7
LH/Width of mouth	2.1 - 2.7	2.6	0.32	37.0 47.6	38.4	7
LH/LCPD	1.4 1.7	1.5	0.11	58.8 - 71.4	66.7	7
LH/HCPD	2.1 2.5	2.3	0.11	40.0 - 47.6	43.4	7
LH/Dorsal fin base	1.3 1.6	1.4	0.11	62.5 76.9	71.4	7
LCPD/HCPD	1.3 1.7	1.5	0.15	58.8 - 76.9	66.7	7

Group - IV

THE *PORCELLUS* GROUP

This group comprises the following species :

(1) *Labeo porcellus* (Heckel, 1844, p.384)
(2) *Labeo kontius* (Jerdon, 1849, p.302)
(3) *Labeo nigrescens* Day, 1870, p.371
(4) *Labeo stoliczkae* Steindachner, 1870, p.634

Common characters of these species are as below :

(1) Snout blunt, with a lateral lobe, except *L. stoliczkae*
(2) Lips thick

(3) Postlabial groove uninterrupted
(4) Dorsal fin with ii or iii simple rays; 12-15 branched rays
(5) Lateral line scales 38-47
(6) Preanal scales 21-28
(7) Scales between dorsal fin and lateral line scales 7-10 1/2

The following is a comparative table of differentiating characters of the four species of the group :-

	Dorsal fin	Ll. scales	Predorsal scales	Prepelvic scales	Preanal scales	Dorsal fin/Ll.	Pelvic fin/Ll.	Anal fin/Ll.	Circum-peduncular scales
Labeo porcellus (Heckel)	ii, 12-14	38-40	13-14	9-11	21-23	7 1/2-8 1/2	5 1/2-6 1/2	6-6 1/2	20-22
Labeo kontius (Jerdon)	ii or iii, 12-14	39-42	12-15	10-12	22-25	8-9	5 1/2-6 1/2	6-7	21-22
Labeo nigrescens Day	ii-iii, 14-15	36-37	10-12	10-12	23-24	7-7 1/2	5 1/2-6	5 1/2-6 1/2	19-20
Labeo stoliczkae Steindachner	iii, 13 .	46-47	12-13	15-16	25-28	9 1/2-10 1/2	7 1/2-8 1/2	6 1/2-7 1/2	21-22

Labeo porcellus (Heckel)

(Fig. 14)

Tylognathus porcellus Heckel, *Hugel's Fische. Kashmir,* **4(2)**: 384, 1844 (type-locality : Bombay).

Labeo porcellus, Beavan, *HBk. Fw. India,* : 62, 1877 (Bombay). Day, *Fish. India,* : 539, pl.128, fig.1, 1878 (Poona, Bombay and Ceylon). Hora, *Rec Indian Mus.* **39(1)**: 7 (Thunga river at Shimoga); 9, 1937 (variation discussed). Misra and Hora, *J. Bombay nat. Hist. Soc;* **39(3)**: 510, pl.2, (Aounda river and Lake Beale, Deolali); 512 (Darna river at its junction with Aounda river); 516 (Darna river near village Sewnsuri, Deolali); 517 (Darna river, South of Lahavit railway station); 518 (Darna river near Lahavit); 519, 1937 (Darna river between Sewnsuri and Beladgon). Hora, *J. Bombay nat. Hist. Soc;* **40(1)**: 22, pl.3, 1938 (Deolali, Bhil name given). Bimachar and Rau, *J. Mys. Univ;* **1**: 146, 1941 (Kadur). Chacko and Kuriyan, *Proc. Indian Acad. Sci;* **28B**(5): 168, 1948 (Shimoga, Mysore, Haripur and Kadur). Ranade, *J. Bombay nat. Hist. Soc;* **51**: 473, 1953 (Baroda). Kalawar and Kelkar, *J. Bombay nat. Hist. Soc;* **53(1)**: 673, 1955 (Kolhapur). David, *Proc. nat. Inst. Sci. India,* **22B**(3): 166, 1956 (very rare in Bhadra river at Bhadravathi, Karnataka; occurrence in polluted water). David, *Proc. nat. Acad. Sci. India,* **33B**(2): 278, 1963 (Godavari and Krishna rivers). Jayaram, *HBk. FW. Fish. India,* : 118, 121, 1981 (distribution and key to the species). Venkateswarlu and Rama Rao, *Rec. zool. Surv. India Occ. Pap;* **(87)**: 11, 1986 (correct name for Day's fishes). Talwar and Jhingran, *Inland Fish;* **1**: 217, 1991 (description and distribution).

Labeo (Morulius) porcellus Deraniyagala, *Spolia Zeylanica,* **16**: 1930.

Labeo porcellus lankae Deraniyagala, *Col. Atlas verteb. Ceylon,* **1**: 41, pl.10, 1952 (type-locality :

Basavakkulam, NCP, Ceylon). Silas, *Bull. nat. Inst. Sci. India,* (7): 254, 1952. Munro, *Marine FW. Fish. Ceylon,* p.46, 1982 (description of the species). Fernando, *FW. Fauna. Fish. Sri Lanka,* p.17, 1990 (brief description of the species).

Vernacular Names : *Khanoos, Tambcki* : MARATHI, *Tambala vanna, Tambalaya, Sevakanya* : SINHALESE

Specimens studied : Total nine examples, 97.0-179.5 mm in SL.

(1) ZSI F 12113 three examples, 97.0-121.0 mm in SL; Moola-Mutha River near Poona, Maharashtra. C.V. Kulkarni.

(2) Colombo Museum FF 624 three examples, 151.0-179.5 mm in SL; Anuradapuram, Sri Lanka. 2nd August 1930.

(3) SRS/ZSI unregistered one example, 127.0 mm in SL; River Krishna at Pachwad, 3 km. from Karad, Satara District, Maharashtra. K.C. Jayaram and party, 31st February 1987.

(4) SRS/ZSI unregistered one example, 123.0 mm in SL; Fish market at Karad, Satara District, Maharashtra. K.C. Jayaram and party, 10th March 1990.

(5) SRS/ZSI unregistered one example, 116.0 mm in SL; Fish market at Bagalkot, Bijapur, Karnataka. K.C. Jayaram and party, 13th March 1992.

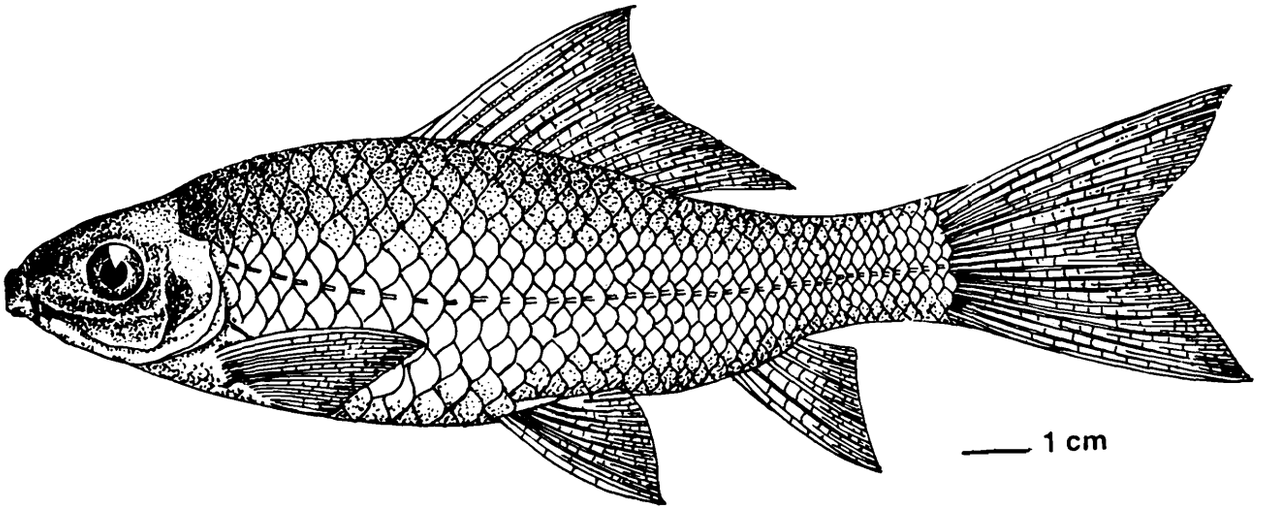

Fig. 14. *Labeo porcellus* (Heckel)

Diagnosis : A *Labeo* with 38-40 lateral line scales. 14-16 (ii, 12-14) dorsal fin rays. Dorsal fin/Ll. 7-7$^{1}/_{2}$. Snout more or less obtuse, with transverse groove and number of open pores; lateral lobe conspicuous.

Description : D ii, 12-14; P. i, 15; V. i. 8;
A. ii, 5; C. 10+9; Ll. 38-40.

Dorsal profile gently arched, body depth 27.7 (25.8-29.6), head length 22.9 (22.3-23.6) in percent of standard length. Head small, width 65.7 (60.9-70.4), height at occiput 77.0 (74.1-80.0), snout length 40.7 (38.0-43.3), width of gape of mouth 25.9 (20.4-31.5), dorsal fin base 120.5 (111.1-129.9) in percent of head length. Eye 56.1 (45.5-66.7) in percent of snout length, 56.1 (45.5-66.7) in percent of interorbital width. Two pairs of barbels, maxillary longer than rostral pair. Snout with four bands of tubercles, a gentle depression and a conspicuous lateral fold. Both lips smooth, continuous at the corner of mouth with an inner cartilaginous covering. Postlabial groove continuous.

Dorsal fin inserted nearer to tip of snout than base of caudal fin; its outer margin concave. Pectoral fin not reaching base of pelvic fin which does not reach the base of anal fin. Anal fin not reaching the base of caudal fin. Caudal fin forked. Least depth of caudal peduncle 67.4 (45.4-89.3) in percent of its length. Latest line straight.

Distribution : INDIA : Peninsular India : Krishna and Godavari rivers. SRI LANKA.

Scales :

Lateral line scales	: 38-40
Predorsal scales	: 13-14
Prepelvic scales	: 9-11
Preanal scales	: 21-23
Dorsal fin/Ll.	: 7$^{1}/_{2}$-8$^{1}/_{2}$
Pelvic fin/Ll.	: 5$^{1}/_{2}$-6$^{1}/_{2}$
Anal fin/Ll.	: 6-6$^{1}/_{2}$
Circumpeduncular scales	: 20-22

Gill rakers : 4-5/30-32

Size : Maximum : 35.0 cm (TL).

Colour : When alive, back is greyish silvery, white on sides and abdomen; scales with a dark edge; a dark spot usually present at the base of caudal fin. Bluish spot on the operculum. Fins slaty. When preserved in formalin, back turns dark brown, abdomen light brown in the anterior half of the body, scales with brownish tinge; all fins dusky.

Remarks : Hora and Misra (1942) synonymised *L. porcellus* with *L. potail* (Sykes) because juveniles of *L. potail* have barbels. But our observation of a large number of specimens shows that though young specimens of both species have rostral barbels, the juveniles of *L. potail* have the size of the rostral barbels reduced, while *L. porcellus* has large sized rostral barbels, equivalent to maxillary ones. Other characters as shown in the table also reveal that both *L. porcellus* and *L. potail* are distinct species. Hora (1937) stated that *L. porcellus* specimens from Thunga river at Shimoga have the upper lip and rostral fold slightly fimbriated, whereas the lower lip is strongly papillated; the papillae long, slender and covering the entire exposed part of the lip; a transverse groove and a number of open pores on the snout were also reported. Present study on *L. porcellus* also confirms Hora's observations. Further, it has been observed that the lips of *L. porcellus* are comparatively thinner than the fleshy lip of *L. potail*. The snout is more projecting than in *L. potail*, tubercles very coarse in *L. porcellus*, whereas in *L. potail* they are soft and thin; mouth is more crescentic than in *L. potail*, while the lower lip of *L. porcellus* is papillated, lower lip of *L. potail* is striated.

Labeo porcellus (Heckel) is known only from Godavari and Krishna rivers and has not been so far recorded from below the Krishna river. Deraniyagala (1952) proposed a *L. porcellus lankae* differing from the forma typica 'in its smaller size' (183 mm). Pethiyagoda (1991) synonymised *L. porcellus lankae* with the nominal form. *L. porcellus* is rare in Sri Lanka. It is likely that the species may be found below the Krishna system if intense search is made. As such, we have synonymised *L. porcellus lankae* Deraniyagala with *L. porcellus*.

Relationship : This species has close resemblance to *L. potail* (Sykes) from which it differs as below :

Characters	***L. porcellus***	***L. potail***
Lateral line scales	38-40	39-41
Preanal scales	21-23	21-25
Dorsal fin/Ll.	$7^1/_2$-$8^1/_2$	8-$8^1/_2$
Gill rakers	4-5/30-32	14-15/48/49
Barbels	4	2
SL/Body depth	25.8-29.6	23.8-37.0
SL/LH	22.3-23.6	22.7-30.3
LH/dorsal fin base	111.1-129.9	90.9-111.1
LCPD/HCPD	45.5-89.3	66.7-100.0

ADDITIONAL DATA

Table : Non-meristic Characters

Labeo porcellus (Heckel)

	Ratio	Mean	SD	Percentage	Mean	n
	Range			Range		
SL/Body depth	3.4 3.9	3.6	0.16	25.8 - 29.6	27.7	9
SL/LH	4.2 4.5	4.3	0.09	22.3 - 23.6	22.9	9
SL/Predorsal length	2.1 2.3	2.2	0.04	44.4 - 47.6	46.0	9
SL/Preanal length	1.2 1.3	1.25	0.02	75.8 - 78.7	77.2	9
SL/Prepelvic length	1.8 1.9	1.85	0.04	50.8 - 54.3	52.6	9
Snout/Eye	1.5 2.2	1.8	0.26	45.5 - 66.7	56.1	9
Iow/Eye	1.5 2.2	1.8	0.27	45.5 - 66.7	56.1	9
LH/Eye	4.1 5.4	4.4	0.53	18.5 - 24.2	21.3	9
LH/Snout	2.3 2.6	2.5	0.10	38.0 - 43.3	40.7	9
LH/Head width	1.4 1.6	1.5	0.08	60.9 - 70.4	65.6	9
LH/HT. at occpt.	1.2 1.4	1.3	0.33	74.2 - 80.0	77.0	9
LH/Width of mouth	3.2 4.9	4.1	0.72	20.4 - 31.5	25.9	9
LH/LCPD	1.3 1.6	1.5	0.10	61.3 - 75.2	68.3	9
LH/HCPD	1.2 2.1	1.9	0.12	48.3 - 56.8	52.6	9
LH/Dorsal fin base	0.8 0.9	0.85	0.05	111.1 - 129.9	120.5	9
LCPD/HCPD	1.1 1.5	1.3	0.12	45.5 - 89.3	67.4	9

Labeo kontius (Jerdon)

(Fig. 15)

Cyprinus kontius Jerdon, *Madras J. Lit. Sci;* **15**: 302, 1849 (type-locality : River Cauvery and its tributaries).

Labeo kontius, Day, *Proc. zool. Soc. Lond;* : 289, 867 (Bowany river). Gunther, *Cat. Fish. Brit. Mus;* **7**: 55, 1868 (Bowany river). Beavan, *HBk. FW. Fish. India.* : 64, 1877 (Madras). Day, *Fish. India.* : 539, pl.127, fig.5, 1878 (Nilgiris, Cauvery and Coleroon). Day, *Fauna. Brit. Ind. Fish;* **1**: 264, 1889 (Nilgiris, Cauvery and Coleroon). Hora, *Rec. Indian Mus;* **44(2)**: 196, 1942 (name only, distribution given as Nilgiri and Mysore). Ranade, *J. Bombay nat. Hist. Soc;* **51**: 473, 1955 (Baroda; doubtful). Rajan, *J. Bombay nat. Hist. Soc;* **53(1)**: 45, 1955 (Bhavani and Moyar rivers; variation discussed). Menon, *Rec. Indian Mus;* **59(4)** [1961]: 379, 1966 (Veeranam Lake) Jayaram, 1981, *HBk. Fw. Fish India.* : 118 (Key). Jayaram *et*

al; Rec. zool. Surv. India. Occ. Pap; (**36**): 70, 1982 (River Cauvery). Venkateswarlu, *Rec. zool. surv. India Occ. Pap;* **56**: 15, 1984 (name only, vernacular names). Venkateswarlu and Rama Rao, *Rec. Zool. Surv. India Occ. Pap;* (**87**): 11, 186 (correct name for Day's fish). Talwar and Jhingran, *Inland Fish;* **1**: 212, 1991 (Tamilnadu and Cauvery river system in South Karnataka).

Vernacular Names : *Kalcher, Konitalu, Moogi-halale* : KANNADA; *Pannivayan* : MALAYALAM ; *Currumunee candee, Curroomoole-candee, Kalselu, Kalchel, Karimuli, Pannivayi-kendai* : TAMIL

Specimens studied : Total 15 examples, 74.0-241.0 mm in SL.

(1) ZSI F 1124 one example, 116.0 mm in SL; River Cauvery. F. Day (purchased).

(2) ZSI F 1134 one example, 241.0 mm in SL; River Bhavani. F. Day (purchased).

(3) ZSI F 1750 four examples, 90.5-108.0 mm in SL; Moyar river, below the electricity Department Camp, Karumathampatti, Coimbatore District, Tamilnadu. S. Rajan, 27th September 1954.

(4) ZSI F 1532 one example, 130.5 mm in SL; Veeranum Lake, Lalpet, South Arcot District, Tamil Nadu. A.G.K.Menon and party, 27th February 1958.

(5) ZSI F 1378 one example, 74.0 mm in SL; River Cauvery at Thirukattupalli, South Arcot District, Tamil Nadu. K.C. Jayaram and party, 1st February 1977.

(6) SRS/ZSI unregistered one example, 119.0 mm in SL; Chembarambakkam Lake, Chengalpet District, Tamil Nadu. R.S. Pillai, 13th July 1979.

(7) SRS/ZSI unregistered one example, 110.0 mm in SL; Breeding pond, State Fisheries Department, Sathanur Dam, South Arcot district, Tamilnadu. T. Venkatesarlu, 27th July 1979.

(8) SRS/ZSI F 3134 one example, 144.0 mm in SL; Bhavani river at Bhavani Sagar Town, Periyar District, Tamil Nadu. (Mrs) K. Rema Devi and party, 15th November 1989.

(9) SRS/ZSI unregistered two examples, 158.5-160.0 mm SL; Biligunda, 10km north of Hoganekkal Falls, Dharmapuri District, Tamil Nadu. A.G.K. Menon and party, 1st January 1991.

(10) SRS/ZSI unregistered two examples, 186.0-189.0 mm SL; Bhavanisagar dam at Bhavani Sagar, Coimbatore district, Tamil Nadu. A.G.K. Menon and party, 14th January 1991.

Diagnosis : A *Labeo* with 39-42 scales on lateral line. 14-16 (ii or iii, 12-14) dorsal fin rays. Snout produced. Mouth wider when compared to other species of *Labeo* so that its local name 'Pannivayan' (meaning Pig-mouth) in apt.

Description : D. ii or iii, 12-14; P. i, 15-16; V. i, 8;
A. i, 5; C. 10+9; Ll. 39-42.

Dorsal profile more arched than abdomen, body depth 30.6 (27.0-34.4), head length 24.6 (20.4-28.9) in percent of standard length. head large, width 62.6 (53.8-71.4), height at occiput

77.6 (66.7-82.6), snout length 41.4 (33.3-49.5), width of gape of mouth 26.7 (20.0-33.3), dorsal fin base 99.3 (86.2-112.3) eye diameter 24.3 (20.0-28.0) in percent of head length. Eye 60.1 (45.0-75.2) in percent of snout length, 49.6 (40.8-58.5) in percent of interorbital width. Two pairs of barbels, maxillary rather longer than the rostral pair. Snout blunt, truncated and projecting with soft or horny tubercles and a short, fleshy lateral prolongation; snout with a lateral lobe. Rostral fold overlaping the upper lip. Both lips thiok with an inner cartilaginous covering, upper lip plain, without any frimbriae; lower lip fringed or papillated. Postlabial groove uninterrupted.

Dorsal fin inserted nearer to the tip of the snout than base of caudal fin. Pectoral fin not reaching pelvic fin. Pelvic fin when laid flat overlaps the anal opening. Anal fin reaches base of caudal fin. Caudal fin forked. Least depth of caudal peduncle 57.1 (46.7-67.6) in percent of its length.

Distribution : INDIA : South India : River Cauvery and its tributaries.

Scales :

Lateral line scales	: 30-42
Predorsal scales	: 12-15
Prepelvic scales	: 10-12
Preanal scales	: 22-25
Dorsal fin/Ll.	: 8-9
Pelvic fin/Ll.	: $5^1/_2$-$6^1/_2$
Anal fin/Ll.	: 6-7
Circumpeduncular scales	: 21-22

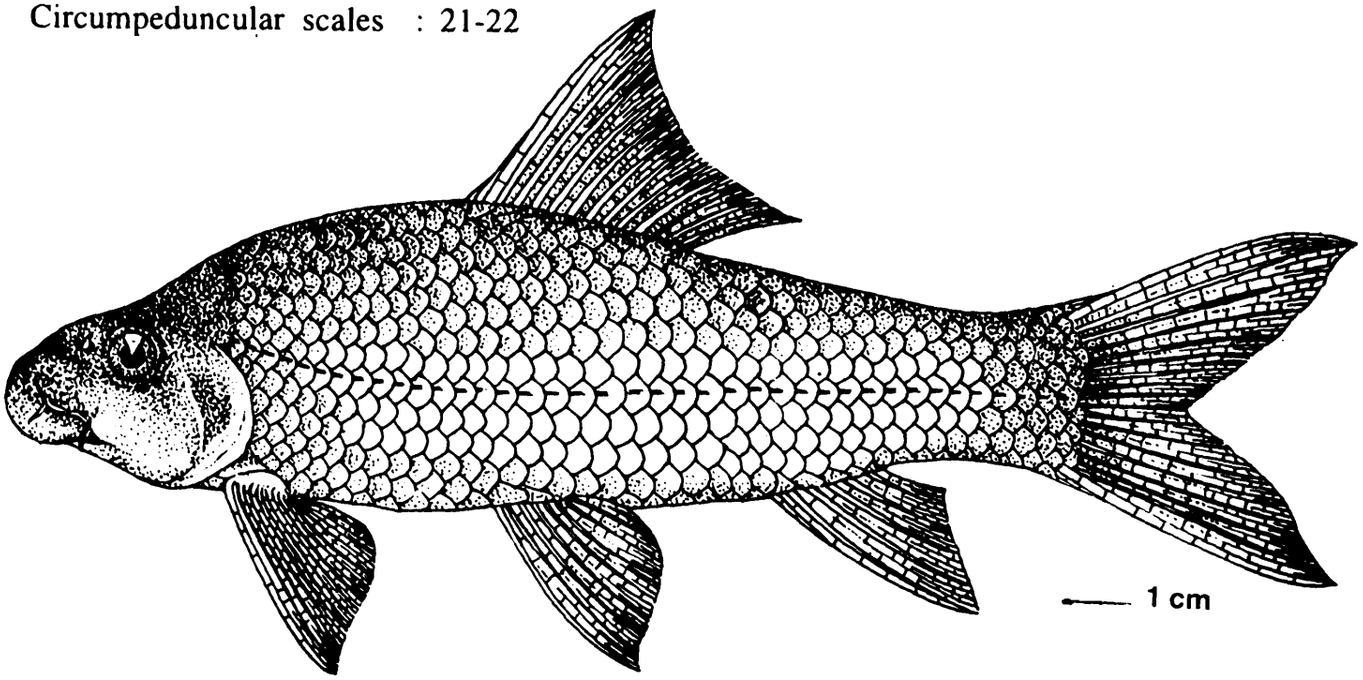

Fig. 15. *Labeo kontius* (Jerdon)

Gill rakers : 8-10/29-32

Size : Maximum : 60.0 cm (TL).

Colour : When alive, reddish or with a fleshy tinge, dark along the black, each scale with red centre. When preserved in formalin, deep cloudy or slaty black, which gradually turns deep brown towards the belly, with yellowish tinge in the ventral side below the isthmus. Fins are slaty.

Relationship : *Labeo kontius* (Jerdon) has close resemblance to *L. potail* (Sykes) of Peninsular India. Though it shares many of the characters of *L. potail*, they can be differentiated thus : dorsal fin ray in *L. kontius* 14-16 (vs 14). In *L. kontius*, rostral barbels are found both in young and adults, but in *L. potail*, the rostral barbels are found only in the young specimens, not in the matured ones.

ADDITIONAL DATA

Table : Non-meristic Characters

Labeo kontius (Jerdon)

	Ratio	Mean	SD	Percentage	Mean	n
	Range			Range		
SL/Body depth	2.9 3.7	3.1	0.20	27.0 - 34.1	30.6	15
SL/LH	3.5 4.9	4.0	0.37	20.4 - 28.8	24.6	15
SL/Predorsal length	1.9 2.2	2.1	0.11	44.8 - 52.1	48.5	15
SL/Preanal length	1.3 - 1.4	1.35	0.03	74.1 78.7	76.4	15
SL/Prepelvic length	1.5 - 2.1	1.9	0.14	48.1 - 66.2	57.1	15
Snout/Eye	1.3 2.2	1.8	0.80	45.0 75.2	60.1	15
Iow/Eye	1.7 - 2.4	2.2	0.22	40.8 - 58.5	49.6	15
LH/Eye	3.5 - 5.0	4.3	0.43	20.0 - 28.6	24.3	15
LH/Snout	2.0 - 3.0	2.4	0.27	33.3 - 49.5	41.4	15
LH/Head width	1.4 - 1.9	1.6	0.11	53.8 - 71.4	62.6	15
LH/HT. at occpt.	1.2 - 1.5	1.4	0.09	66.7 - 82.6	74.6	15
LH/Width of mouth	3.0 5.0	3.8	0.60	20.0 - 33.3	26.7	15
LH/LCPD	1.2 2.0	1.5	0.21	50.0 - 83.3	66.7	15
LH/HCPD	1.5 - 2.1	1.9	0.19	46.7 67.6	57.1	15
LH/Dorsal fin base	0.9 - 1.2	1.0	0.27	86.2 - 112.3	99.3	15
LCPD/HCPD	1.5 - 2.1	1.6	0.38	46.7 - 67.6	57.1	15

Labeo nigrescens Day

(Fig. 16)

Labeo nigrescens Day, *Proc. zool. Soc. Lond.*, : 371, 1870 (type-locality : Mangalore). Beavan, ***HBk. Fw. Fish. India.*** : 62, 1877 (Madras). Day, *Fish. India,* : 536, pl.127, fig.2, 1878 (Mangalore and South Canara). Day, *Fauna Brit. Ind. Fish;* **1**: 259, 1889 (Mangalore and South Canara). Hora, *J. Asiat. Soc. Beng;* **22(3)**: 97, 1927 (fish drawings in the Mackenzies's collections "Hoggreer river near Bellary"). Jayaram, *HBk. Fw. Fish. India.* : 120, 1981 (key to species). Venkateswarlu, *Rec. zool. Surv. India Occ. Pap;* **(56)**: 35, 1985 (name only, vernacular names). Venkateswarlu and Rama Rao, *Rec. zool. Surv. India Occ. Pap;* **(87)**: 11, 1986 (current name for Day's fishes). Talwar and Jhingran, ***Inland Fish;*** 1: 215, 1991 (Karnataka State).

Vernacular Names : Mulvel Kurrimeenu : KANNADA.

Specimens studied : Total four examples, 59.0-172.0 mm in SL.

(1) ZSI F 1125 one example, 172.0 mm in SL; Mangalore, Karnataka. F. Day, 1870.

(2) SRS/ZSI unregistered one example, 165.0 mm in SL; River Krishna at Bhilwada, 22 km from Sangli, Maharashtra. K.C. Jayaram and party, 28th December 1987.

(3) SRS/ZSI unregistered one example, 59.0 mm in SL; River Krishna at Krishna agraharam, Gadwal, Andhra Pradesh. K.C. Jayaram and party, 29th May 1988.

(4) SRS/ZSI F 1363 one example, 62.0 mm in SL; River Krishna at Kullur Road, Andhra Pradesh. T. Venkateswarlu, 29th April, 1990.

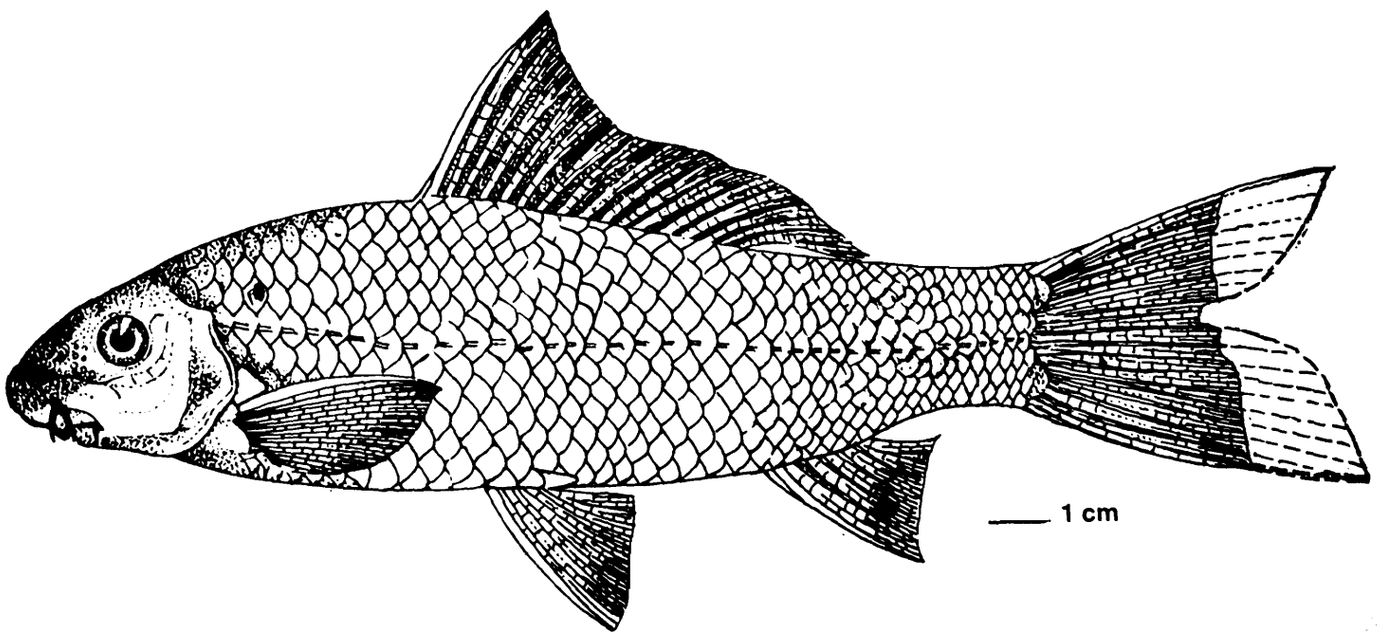

Fig. 16. *Labeo nigrescens* Day

Diagnosis : A *Labeo* with 16-18 dorsal fin rays. Lateral line scales 36 or 37. Four barbels and nearly black in colour. Each scale with a black spot at its base. Snout with glands, swollen and rounded, with a small lateral lobe. Mouth inferior; upper lips lightly fimbiated, lower lip fringed.

Description : D. ii or iii, 14-15; P. i, 15-16; V. i, 8;
A. ii, 5; C. 10+9; Ll. 36 or 37.

Dorsal profile gently arched, body depth 31.6 (26.7-36.6), head length 23.2 (20.6-25.8) in percent of standard length. Head moderate, width 69.5 (60.2-78.7), height at occiput 79.9 (68.9-90.9), snout length 38.6 (33.3-43.9), width of gape of mouth 24.1 (18.8-29.4), dorsal fin base 118.7 (107.5-129.9) in percent of head length. Eye 68.6 (57.1-80.0) in percent of snout length, 58.3 (50.0-66.7) in percent of interorbital width. Snout truncated, covered with band of pores, with a lateral fold. Rostral fold overlapping the upper lip. Labial fold continuous across the lower jaw, lower lip fringed. A cartilaginous covering to inner surface of both lips. Two pairs of barbels, prominent, rostral shorter.

Dorsal fin inserted midway between tip of snout and caudal fin base, outer margin of dorsal fin concave. Pectoral fin inserted laterally, reaching pelvic fin. Anal fin when laid flat reaches base of caudal fin. Least depth of caudal peduncle 81.5 (72.9-90.1) in percent of its length. Caudal fin forked.

Distribution : INDIA : River Krishna, Dakshina Kannada, Karnataka and Maharashtra.

Scales :

Lateral line scales	: 36 or 37
Predorsal scales	: 10-12
Prepelvic scales	: 10-12
Preanal scales	: 23-24
Dorsal fin/Ll.	: 7-7$^1/_2$
Pelvic fin/Ll.	: 5$^1/_2$-6
Anal fin/Ll.	: 5$^1/_2$-6$^1/_2$
Circumpeduncular scales	: 19-20

Gill rakers : 9-11/30-34

Size : Maximum : 45.0 cm (TL)

Colour : In live condition black or slaty black; when preserved in formalin, the dorsal side becomes dark brown, ventral with an yellowish tinge.

ADDITIONAL DATA

Table : Non-meristic Characters

Labeo nigrescens Day

	Ratio Range	Mean	SD	Percentage Range	Mean	n
SL/Body depth	2.7 3.8	3.3	0.37	26.7 - 36.6	31.6	4
SL/LH	3.9 4.9	4.2	0.39	20.6 - 25.8	23.2	4
SL/Predorsal length	1.9 2.4	2.1	0.17	41.8 - 51.3	46.6	4
SL/Preanal length	1.2 1.3	1.25	0.03	74.6 - 80.0	77.3	4
SL/Prepelvic length	1.9 2.0	1.95	0.04	50.0 - 55.6	52.8	4
Snout/Eye	1.3 1.8	1.5	0.21	57.1 - 80.0	68.6	4
Iow/Eye	1.5 2.0	1.7	0.21	50.0 - 66.7	58.3	4
LH/Eye	3.6 4.3	3.9	0.19	23.5 - 26.7	25.1	4
LH/Snout	2.3 3.0	2.6	0.32	33.3 - 43.9	38.6	4
LH/Head width	1.3 1.7	1.5	0.14	60.2 - 78.7	69.5	4
LH/HT. at occpt.	1.1 1.5	1.3	0.13	68.9 - 90.9	79.9	4
LH/Width of mouth	3.4 5.3	4.3	0.86	18.8 - 29.4	24.1	4
LH/LCPD	1.1 1.8	1.4	0.24	56.5 - 93.5	74.9	4
LH/HCPD	1.2 2.0	1.7	0.30	50.0 - 83.3	66.7	4
LH/Dorsal fin base	0.8 0.9	0.85	0.06	107.5 - 129.9	118.7	4
LCPD/HCPD	1.1 1.4	1.2	0.10	72.9 - 90.1	81.5	4

Relationship : This species is related to *Labeo calbasu* (Hamilton); both species exhibit slaty black colour all over body including fins; but they can be differentiated by certain meristic characters. Lateral line scales in *L. nigrescens* 36-37, whereas in *L. calbasu* 40-44; scales between dorsal fin base and Ll in *L. nigrescens* 7-7$^{1}/_{2}$, in *L. calbasu* 7$^{1}/_{2}$-9$^{1}/_{2}$.

Remarks : Since Day's (1870) first report of this fish from Mangalore, no specimen has been reported from the type-locality or adjacent areas, though Hora (1927), Venkateswarlu (1984), Venkateswarlu and Rama Rao (1986) cited the species in their literature. Collections from Krishna river in 1987, extends its range of distribution.

Labeo stoliczkae Steindachner

(Fig. 17)

Labeo stoliczkae Steindachner, *Sitz. Akad. Wiss;* **61**: 634, 1870 (Type-locality : Moulmein, Burma). Day, *Fish. India,* : 537, pl.135, fig.1, 1877 (Irrawaddy river and also Moulmein, specimen figured from

Prome). Day, *Fauna Brit. Ind. Fish;* **1**: 260, 1889 (Irrawaddy river and also Moulmein). Vinciguerra, *Ann. Mus. Civ. Stor. nat. Gen;* **9(2)**: 267, 1880 (Burma). Jayaram, *HBk. Fw. Fish. India.* p.1981 (Burma). Talwar and Jhingran, *Inland Fish;* **1**: 221, 1991 (Burma : Irrawaddy and Moulmein rivers).

Vernacular Names : Nil

Specimens studied : Total two examples, 134.0-164.5 mm in SL.

(1) ZSI F 11126 one example, 164.5 mm in SL; Bhamo, Burma.

(2) ZSI F 2598 one example, 134.0 mm in SL; Moulmein river, Burma.

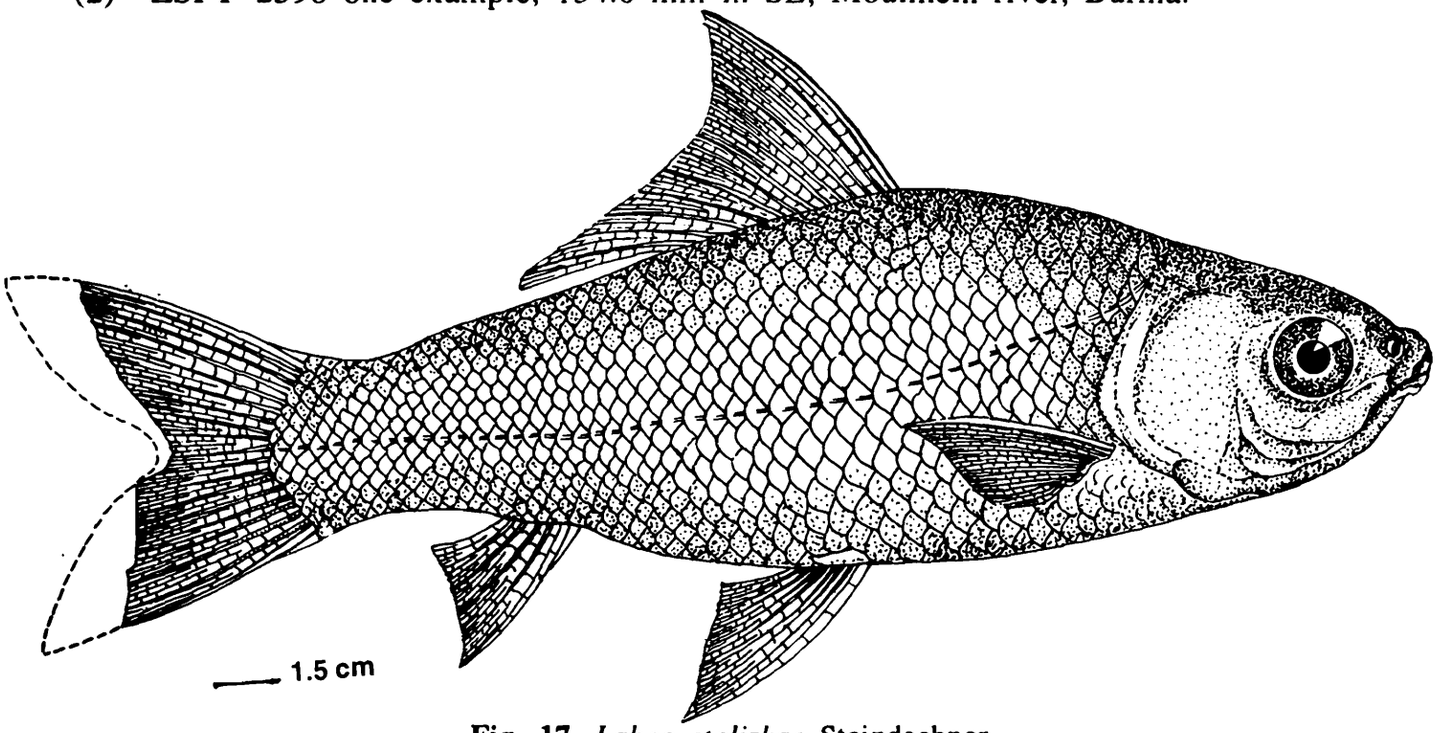

Fig. 17. *Labeo stolizkae* Steindachner

Diagnosis : A *Labeo* with 46-47 scales on lateral line and dorsal fin with 16 rays.

Description : D. iii, 13, P. i, 15-16; V. i, 8;
A. ii, 5; C. 10+9; Ll. 46-47.

Dorsal profile gently arched, body depth 32.8 (32.2-33.3), head length 31.8 (30.3-33.3) in percent of standard length. Head moderate, width 55.7 (52.6-58.8), height at occiput 77.3 (71.4-88.3), snout length 25.3 (24.3-26.3), width of gape of mouth 26.6 (26.3-27.0), dorsal fin base 69.0 (66.6-71.4), eye diameter 23.2 (22.2-24.3) in percent of head length. Eye 95.5 (90.9-100.0) in percent of snout length, 46.5 (45.4-47.6) in percent of interorbital width. A pair of small maxillary barbels, often seen under the labial fold. Snout with pores, not overhanging the mouth, without any lateral lobe. A deep groove across the chin with distinct a labial fold. Lips thick, with a transverse inner fold above and below. Postlabial groove uninterrupted.

Dorsal fin inserted nearer to tip of snout than to base of caudal fin. Free edge of the dorsal fin concave. Pectoral fins shorter than head, not extending to pelvic fins which reach the base of anal fin. Caudal fin forked. Least depth of caudal peduncle 69.0 (66.6-71.4) in percent of its length.

Distribution : MYANMAR : Irrawaddy and moulmein rivers, also in Prome.

Scales :

Lateral line scales : 46-47
Predorsal scales : 12-13
Prepelvic scales : 15-16
Preanal scales : 25-28
Dorsal fin/Ll. : $9^{1}/_{2}$-$10^{1}/_{2}$
Pelvic fin/Ll. : $7^{1}/_{2}$-$8^{1}/_{2}$
Anal fin/Ll. : $6^{1}/_{2}$-$7^{1}/_{2}$
Circumpeduncular scales : 21-22

Gill rakers : 7-8/51-53

ADDITIONAL DATA

Table : Non-meristic Characters

Labeo stolickzae Steindachner

	Ratio	Mean	SD	Percentage	Mean	n
	Range			Range		
SL/Body depth	3.0 3.1	3.05	0.05	32.2 - 33.3	32.8	2
SL/LH	3.0 3.3	3.1	0.15	30.3 33.3	31.8	2
SL/Predorsal length	2.1 2.2	2.15	0.05	45.5 - 47.6	46.5	2
SL/Preanal length	1.2 1.3	1.25	0.05	76.9 - 83.3	80.1	2
SL/Prepelvic length	1.7 2.0	1.8	0.15	50.0 - 58.8	54.4	2
Snout/Eye	1.0 1.1	1.05	0.05	90.9 100.0	95.4	2
Iow/Eye	2.1 2.2	2.15	0.05	45.5 - 47.6	46.5	2
LH/Eye	4.1 4.5	4.3	0.20	22.2 - 24.3	23.2	2
LH/Snout	3.8 4.1	3.9	0.15	24.3 - 26.3	25.3	2
LH/Head width	1.7 1.9	1.8	0.10	52.6 - 58.8	55.7	2
LH/HT. at occpt.	1.2 1.4	1.3	0.10	71.4 - 83.3	77.3	2
LH/Width of mouth	3.7 3.8	3.75	0.05	26.3 - 27.0	26.6	2
LH/LCPD	1.7 1.9	1.8	0.10	52.6 58.8	55.7	2
LH/HCPD	2.4 3.0	2.7	0.30	33.3 - 41.6	37.4	2
LH/Dorsal fin base	1.4 1.5	1.45	0.05	66.6 - 71.4	69.0	2
LCPD/HCPD	1.4 1.5	1.45	0.05	66.6 - 71.4	69.0	2

Size : Maximum : 164.5 mm (TL)

Colour : When alive, a deep black shadowed silvery tinge along the dorsal side up to half of lateral line; lower flank golden, often with a black mark behind gill opening.

Relationship : This fish has close resemblance to *L. rohita* (Hamilton). Both *L. stolickzae* and *L. rohita* have overhanging snout, with flat interorbital width, without lateral lobe; small and narrow mouth, upper and lower lips continuous across the lower jaw, with slightly fimbrated lips. In *L. stoliczkae* the lips are thicker and more reflected off from the mouth than in *L. rohita.*

Moreover, there are also conspicuous differences in meristic characters. Lateral line scales 46-47 (vs 40-43). Preanal scales 25-28 (vs 23-26). Dorsal fin/Ll. $9^1/_2$-$10^1/_2$ (vs $7^1/_2$-8).

Group - V
THE *FIMBRIATUS* GROUP

This group comprises the following species :

(1) *Labeo fimbriatus* (Bloch, 1795, p.50)
(2) *Labeo calbasu* (Hamilton, 1822, p.287)
(3) *Labeo nandina* (Hamilton, 1822, p.300)
(4) *Labeo rohita* (Hamilton, 1822, p.301)

Common characters of these species are as below :

1. No lateral lobe, except in *L. calbasu*
2. Lips fleshy and papillose
3. Upper and lower lip with inner fold
4. Mouth narrow
5. Dorsal fin with ii or iii simple rays; 12-24 branched rays
6. Lateral line scale 40-47
7. Predorsal scales 12-18
8. Prepelvie scales 10-14
9. Preanal scales 22-28
10. Analfin/Ll. $5^1/_2$-$7^1/_2$
11. Circumpeduncular scales 19-24

Following is a comparative table of the differences between the four species of the group :-

	Dorsal fin	Ll. scales	Predorsal scales	Prepelvic scales	Preanal scales	Dorsal fin/Ll.	Pelvic fin/Ll.	Anal fin/Ll.	Circum-peduncular scales
L. fimbriatus (Bloch)	ii or iii, 12-14	42-47	16-18	12-14	26-28	$9^1/_2$-$10^1/_2$	$6^1/_2$-$7^1/_2$	$6^1/_2$-$7^1/_2$	21-24
L. rohita (Hamilton)	ii-iii, 12-14	40-43	13-15	10-12	23-26	$7^1/_2$-8	$5^1/_2$-$6^1/_2$	$5^1/_2$-$6^1/_2$	20-22
L. calbasu (Hamilton)	iii, 12-15	40-44	10-14	9-12	22-26	$7^1/_2$-$9^1/_2$	$5^1/_2$-$6^1/_2$	$5^1/_2$-$6^1/_2$	18-23
L. nandina (Hamilton)	ii or iii, 22-24	42-44	12	10-11	25	$7^1/_2$-8	6	6	21-22

Labeo fimbriatus (Bloch)

(Fig. 18)

Cyprinus fimbriatus Bloch, *Ichthyologie,* **12**: 50, pl.409, 1795 (type-locality : Madras).

Cyprinus nancar, Hamilton, *Fish. Ganges,* : 299, 387, 1822 (type-locality : "River Gunggi", Gorakhpur). Valenciennes (in Cuvier and Valenciennes), *Hist. nat. Poiss;* **16**: 70, 1842.

Cirrhinus nancar, McClelland, *Ind. Cyp;* : 266, 325, 1839 (North-eastern parts of Bengal).

Rohita fimbriata, Valenciennes (in Cuvier and Valenciennes), *Hist. nat. Poiss;* **16**: 271, 1842.

Varicorhinus bobree Sykes, *Trans. zool. Soc.,* **2**: 355, pl.61, fig.3, 1841 (Deccan).

Leuciscus bobree, Bleeker, *Verb. Bat. Gen;* **25**: 25, 1853.

Cirrhinus fimbriatus, Jerdon, *Madras J. Lit. Sci;* **15**: 304, 1849 (Pondicherry).

Cirrhinus leschenaultii, Jerdon, *Madras J. Lit. Sci;* **15**: 305, 1849 (Pondicherry and Malabar Coast).

Labeo leschenaultii, Gunther, *Cat. Fish. Brit. Mus;* **7**: 53, 1868 (East India continent; Kotamurdoor tank, south Arcot, Orissa, Central Asia).

Labeo fimbriatus, Gunther, *Cat. Fish. Brit. Mus;* **7**: 53, 1868 (Madras). Beavan, *HBk. Fw. Fish. India.* p.61, 1877 (South and Central India). Day, *Fish. India,* : 536, pl.126, fig.3, 1878 (Sind, Punjab, the Deccan and probably North-east Bengal, South India to Orissa). Day, *Fauna Brit. Ind. Fish;* **1**: 258, 1889. Misra, *Rec. Indian mus;* **40**: 261, 1938 (fish market at Kadoor, Cuddapah District, Eastern Ghats). Hora, *Rec. Indian Mus;* **44(2)**: 196, 1942 (name only; distribution given as Sind, Punjab, Deccan and South India to Orissa; not recorded from Malabar). Fraser, *J. Bombay nat. Hist. Soc;* **43(1)**: 83, 1942 (name only, specific name given as *L. fimbriata,* Poona). Hora and Misra, *J. Bombay Nat. Hist. Soc;* **43(2)**: 220, 1942 (name only, distribution given as Poona, Hindi names, specific name spelt as *'fimbriata'*). Chauhan, *Rec. Indian Mus;* **42(2&3)**: 270, (Dhubel Bundh, Purni Bundh, Patna State, Orissa); 271 (Agalpur, Patna

State); 273, 1947 (Bolangir). Chacko and Kuriyan, *Proc. Indian Acad. Sci;* **28B**(5): 168, 1948 (distribution only). Hora, *J. zool. Soc. India,* **1**: 2, 1949 (name only, Rihand river, Mirzapur District, Uttar Pradesh). Menon, *Proc. nat. Inst. Sci. India,* **18(6)**: 484, 1950 (Mahanadi river, Pennar river, Palar river, Eastern Ghats). Hora, *J. Asiat. Soc. Beng;* **17(2)**: 145, 160, 166, pl.20, fig.6, 1951. Hora, *J. Asiat. Soc. Bengal,* **18(2)**: 64, pl.1, 1952 (replaces *Labeo rohita* in south India). Chacko *et al; Contri. Fw. biol. Stn. Madras,* **3**: 3, 1952 (Kanigiri, Duvvur reservoir, Nellore District, Andhra Pradesh). Chauhan and Ramakrishna, *Rec. Indian Mus;* **51**: 407, pl.11, fig.4, 1953 (tank at Salebhatta, Bolangir and Ang river at Agalpur, Orissa). Job, David and Das, *Indian J. Fish;* **2(1)**: 33, 1955 (most common in Hirakud dam, Mahanadi river, Orissa). Motwani and David, *J. zool. Soc. India,* **9(1)**: 11, 1957 (record of Hora, 1949 from Rihand river cited). Misra, *Rec. Indian. Mus;* **57**: 162, 1959 (distribution only). David, *Proc. nat. Acad. Sci. India,* **33B**(2): 278, 1963 (Godavari and Krishna rivers). Datta and Majumdar, *Rec. Zool. Surv. India,* **62(1&2)**: 82, pl.9. fig.3, 1970 (Soorapur-ki-Nadi, Durgapur District, Rajasthan). Venkateswarlu and Rama Rao, *Seafd. Expt. J;* **5(6)**: 3, 1973 (name only). Mirza, *Biologia,* **20(1)**: 78, 1974 (distribution in Indus Plain, Pakistan). Mirza, *Bijdr. Dierk,* **45(2)**: 173, 1975 (distribution in Pakistan; Indus Plain only). Rao, *Matsya,* **2**: 57, 1976 (name only, Godavari estuary). Murthy, *Proc. Indian. Acad. Sci;* **85B**(3): 137, pl.4, fig.3, 1977 (Kolleru lake, description, specific name given as *Labeo fimbriata*). Venkateswarlu and Menon, *Acta Ichthyol. Piscat;* **9(1)**: 51, 1978 (checklist of fishes of Ganges). Mirza, *Proc. Ist Pakistan Congr. Zool;* p.12, 1980 (name only, distribution in Pakistan and elsewhere; original names and Day's equivalent given). Jayaram, *HBk. Fw. Fish. India.* : 120, 1981 (key to species). Jayaram *et al., Rec. zool. Surv. India Occ. Pap;* **(36)**: 10, 1982 (Cauvery river). Lone, *Inland Fish. Aquacult. Pakistan.* : 42, 1983 (name only, distribution in Pakistan and elsewhere). John Singh and Vickram, *J. Bombay nat. Hist. Soc;* **84(3)**: 531, 1987 (Tambraparani, Servalar, Manimuthar, Papanasam dam; introduced). Talwar and Jhingram, *Inland Fish;* **1**: 208, 1991 (distribution as Pakistan, India : West Bengal and Eastern Ghats, Nepal and Burma)

Vernacular Names : *Belji* : GUJARATI; *Kemmeen Kijan, Thamakenum Meenu* : KANNADA; *Chenchuncan, Pirichundan* : MALAYALAM; *Tambra, Tambir* : MARATHI; *Bahrum, Pudsa, Puduri* : ORIYA; *Gundumanisel, Selkendai, Shall, Venkendai* : TAMIL ; *Gandu Meenu, Yerragandu meenu* : TELUGU.

Specimens studied : Total 39 examples, 65.0-415.0 mm in SL.

(1) SRS/ZSI F 2892 one example, 65.0 mm in SL; Bandar canal, Vijayawada, Andhra Pradesh. T. Venkateswarlu and party, 3rd October 1973.

(2) SRS/ZSI unregistered one example, 157.0 mm in SL; Breeding pond, Madras State Fisheries, Sathanur Dam, North Arcot District, Tamil Nadu. T. Venkateswarlu, 27th July 1979.

(3) SRS/ZSI unregistered two examples, 85.0-87.0 mm in SL; River Pennar at Mylavaram North canal, Andhra Pradesh. T. Venkateswarlu, 30th June 1983.

(4) SRS/ZSI unregistered four examples, 99.0-130.0 mm in SL; River Pennar at Gangawaram, Andhra Pradesh. T. Venkateswarlu, 1st July 1983.

(5) SRS/ZSI F 941 one example, 100.0 mm in SL; River Pennar at Cuddaph, Andhra Pradesh. T. Venkateswarlu, 7th April 1986.

(6) SRS/ZSI unregistered three examples, 192.0-258.0 mm in SL; River Krishna at Krishna bridge near Devasugur, 20 km from Raichur, Karnataka. K.C.Jayaram and party, 21st December 1987.

(7) SRS/ZSI unregistered one example, 191.0 mm in SL; river Tungabhadra at Rajolibandah, 40 km from Raichur, Karnataka. K.C. Jayaram and party, 24th May 1988.

(8) SRS/ZSI unregistered one example, 236.0 mm in SL; River Krishna at Satarasala, 27 km east of Macherla, Andhra Pradesh. K.C. Jayaram and party, 27th June 1989.

(9) SRS/ZSI unregistered one example, 415.0 mm in SL; River Krishna at Regulagadda 1 km down stream of Tangeda, Andhra Pradesh. K.C. Jayaram and party, 29th June 1989.

(10) SRS/ZSI unregistered two examples, 176.0-219.0 mm in SL; River Krishna at Ibrahimpatnam, Vijayawada, Andhra Pradesh. K.C. Jayaram and party, 2nd July 1989.

(11) SRS/ZSI unregistered one example, 164.0 mm in SL; River Krishna at Puligadda, 2 km east of Vijayawada, Andhra Pradesh. K.C. Jayaram and party, 4th July 1989.

(12) SRS/ZSI unregistered seven examples, 144.0-153.0 mm in SL ; River Krishna at Ibrahimpatnam, Vijayawada, Andhra Pradesh. K.C. Jayaram and party, 18th January 1990.

(13) SRS/ZSI unregistered six examples, 124.0-183.0 mm in SL; Fish market at Sangli Town, Maharashtra. K.C. Jayaram and party, 6th March 1990.

(14) SRS/ZSI unregistered six examples, 148.0-170.0 mm in SL; Fish market at Karad, Maharashtra. K.C. Jayaram and party, 10th March 1990.

(15) SRS/ZSI unregistered two examples, 114.0-126.0 mm in SL; Fish market at Bhagalkot, Karnataka. K.C. Jayaram and party, 11th March 1990.

Diagnosis : A *Labeo* with 18 to 22 dorsal fin rays. Snout without lateral lobe; narrow mouth, lips highly fringed; dorsal region of lower lip with two rows of fimbriae. Lateral line scales 42-47. Scales between lateral line and dorsal fin base usually $9^1/_2$-$10^1/_2$.

Description : D. ii or iii, 15-19; P. i, 14-15; V. i, 8;
A. ii or iii, 5; C. 9+10; L.l 42-47.

Dorsal profile gently arched, body depth 35.5 (30.5-40.5), head length 24.8 (21.7-27.8) in percent of standard length. Head large, width 61.8 (52.1-71.4), height at occiput 77.1 (65.8-88.5), snout length 34.4 (24.4-44.4), width of gape of mouth 24.2 (17.7-30.6), dorsal fin base

120.5 (105.3-153.8), eye diameter 23.7 (17.9-29.4) in percent of head length. Eye 65.4 (40.0-90.9) in percent of snout length, 51.7 (31.9-71.4) in percent of interorbital width. Mouth narrow. Rostral fold covers upper lip; no lateral lobe; labial fold continuous across the lower jaw; both lips fimbriated; with a cartilaginous covering to inner sruface. Two pairs of barbels, rostral and maxillary.

Dorsal fin inserted nearer tip of snout than caudal fin base; Pectoral fins nearly as long as head. Pelvic fins do not extend to anal fin. Anal fin when laid flat reaches base of caudal fin. Caudal fin deeply forked. Least depth of caudal peduncle 91.8 (72.5-111.1) in percent of its length.

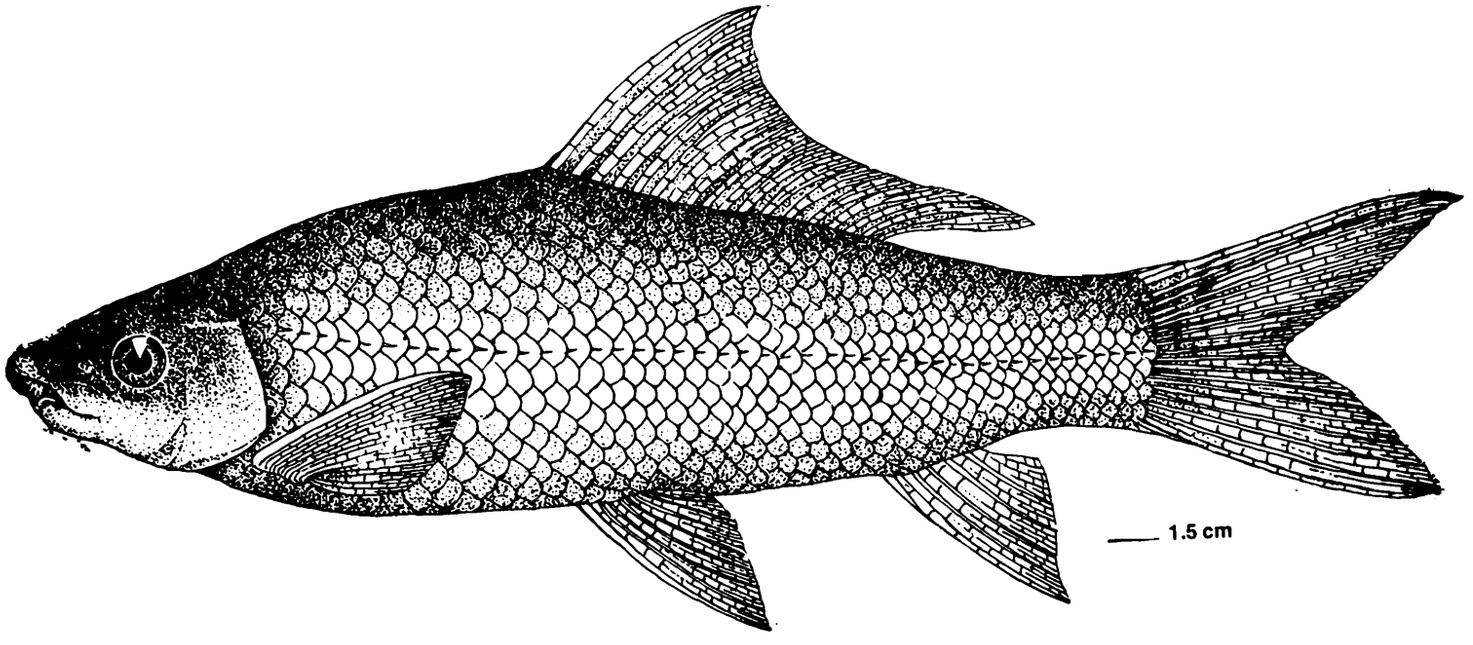

Fig. 18. *Labeo fimbriatus* (Bloch)

Distribution : INDIA : Throughout. PAKISTAN, NEPAL, MYANMAR and BANGLADESH.

Scales :

Lateral line scales	: 42-47
Predorsal scales	: 16-18
Prepelvic scales	: 12-14
Preanal scales	: 26-28
Dorsal fin/Ll.	: $9^1/_2$-$10^1/_2$
Pelvic fin/Ll.	: $6^1/_2$-$7^1/_2$
Anal fin/Ll.	: $6^1/_2$-$7^1/_2$
Circumpeduncular scales	: 20-24

Gill rakers : 13-27/41-67

Size : Maximum : 60.0 cm (TL)

Colour : Silvery along the back, becoming lighter on the flank and sides. In the young, a diffused black blotch present at the base of caudal fin. Pelvic, anal and lower lobe of caudal fins stained slaty. In formalin preserved specimens, the upper half of caudal peduncle light bluish. sides and abdomen always pink.

Relationship : *Labeo fimbriatus* is closely related to *L. nandina* and *L. rohita*, but it can be distinguished by its number of dorsal fin rays 17-22 (vs 24-27 in *L. nandina* and 14-16 in *L. rohita*) and SL/Body depth 30.5-40.5 (vs 29.3-37.4 in *L. nandina* and 24.8-38.5 in *L. rohita*).

ADDITIONAL DATA

Table : Non-meristic Characters

Labeo fimbriatus (Bloch)

	Ratio	Mean	SD	Percentage	Mean	n
	Range			Range		
SL/Body depth	2.5 - 3.3	3.0	0.19	30.5 - 40.5	35.5	39
SL/LH	3.6 4.6	4.1	0.27	21.7 - 27.8	24.8	39
SL/Predorsal length	1.9 - 2.2	2.1	0.06	46.3 - 52.6	49.5	39
SL/Preanal length	1.2 1.3	1.25	0.03	76.3 - 84.7	80.5	39
SL/Prepelvic length	1.2 1.9	1.8	0.11	51.0 - 80.0	65.5	39
Snout/Eye	1.1 - 2.5	1.6	0.32	40.0 - 90.9	65.4	39
Iow/Eye	1.4 3.1	2.1	0.43	31.9 - 71.4	51.7	39
LH/Eye	3.4 5.7	4.4	0.55	17.9 - 29.4	23.7	39
LH/Snout	2.2 4.1	2.7	0.36	24.4 - 44.4	34.4	39
LH/Head width	1.4 1.9	1.6	0.13	52.1 - 71.4	61.8	39
LH/HT. at occpt.	1.1 1.5	1.3	0.08	65.8 - 88.5	77.1	39
LH/Width of mouth	3.3 5.6	4.2	0.64	17.7 - 30.6	24.2	39
LH/LCPD	1.3 1.9	1.6	0.13	53.2 - 75.2	64.2	39
LH/HCPD	1.5 2.3	1.8	0.35	43.7 - 65.8	54.7	39
LH/Dorsal fin base	0.7 0.9	0.8	0.07	105.3 - 153.8	120.5	39
LCPD/HCPD	0.9 1.5	1.2	0.09	72.5 - 111.1	91.8	39

Labeo calbasu (Hamilton)

(Fig. 19)

Cyprinus calbasu, Hamilton, *Fish. Ganges,* : 297, 287, Pl.2, fig.83, 1822 (type-locality : Bengal).

Cirrhinus calbasu, McClelland, *Asiat. Res;* **19**: 265, 320, 1839 (Bengal and Assam).

Cirrhina micropogan, Valenciennes, *Jacq. Voy. Ind. Ori;* : 372, pl.3, fig.3, 1841.

Labeo velatus, Valenciennes (in Cuvier), *Regne Ani. III. Poiss;* pl. 93, fig, 3, 1842.

Rohita belangeri, Valenciennes, *Hist. nat. Poiss;* **16**: 255, 1842 (type-locality : Bengal). Bleeker, *Verh. Bat. Gen;* **25**: 131, 1853.

Rohita reynauldi, Valenciennes, *Hist. nat. Poiss;* **16**: 247, pl.474, 1842 (type-locality : River Irrawaddy, Burma).

Rohita calbasu, Valenciennes, *Hist. nat. Poiss;* **16**: 252, 253, 1842. Bleeker, *Verh. Bat. Gen;* **25**: 132, 1853.

Cirrhinus belangeri, (nec. Day), Jerdon, *Madras J. Lit. Sci;* **15**: 303, 1849.

Cirrhinus affinis Jerdon, *Madras J. lit. Sci;* **15**: 303, 1849.

Labeo calbasu, Gunther, *Cat. Fish. Brit. Mus;* **7**: 54, 1868 (Bengal). Day, *Proc. zool. Soc. Lond;* p.372, 1869 (rivers and ponds of Orissa). Beavan, *HBk. Fw. Fish India,* : 62, 1877 (throughout India). Day, *Fish. India,* : 536, pl.126, fig.4, 1877 (Punjab, Sind, Cutch, Deccan, Southern India and Malabar from Kistna through Orissa, Bengal and Burma). Day, *Fauna Brit. Ind. Fish;* **1**: 93, 1889 (Punjab, Sind, Southern India and Malabar from Krishna through Orissa, Bengal and Burma). Vinciquerra, *Ann. Mus. Civ. Stor. nat. Gen;* **(2)**9: 265, 1889 (Burma). Jenkins, *Rec. Indian Mus;* **6**: 288, 1909 (specific name given as *L. kalbasu*, river Barakar, West Bengal). Chaudhuri, *Rec. Indian Mus;* **6**: 23, 1911 (name only, Yunnan). Raj, *Rec. Indian Mus;* **12**: 251, 253, 255, 1916 (Madras). Hora, *Rec. Indian Mus;* **22**: 166, 1921 (Manipur). Hora, *J. Asiat. Soc. Beng;* **22(3)** [1926]: 124, 1927 (manuscript drawings of Alexander Burnes, Pinjore Lake, Lahore). Hora, *J. Bombay nat. Hist. Soc;* **32(4)**: 804, 1928. Prashad and Mukerji, *Rec. Indian Mus;* **31**: 192, 1929 (Western parts of Indawgyi Lake, Burma). Hora. *Rec, Indian Mus;* **38**: 212, 1936. Hora and Misra, *J. Bombay nat. Hist. Soc;* **39(3)**: 510, pl.2, 1937 (Auonda river, Lake Beale, Deolali). Shaw and Shebbeare, *J. Asiat. Soc. Beng;* **3**: 52, pl.5, fig.2, text-fig. 48, 1937 (deep pools in clear sluggish streams in North Bengal). Hora and Misra, *J. Bombay nat. Hist. Soc;* **40(1)**: 22, pl.3, 1938 (Deolali). Hora, *Rec. Indian Mus;* **40(2)**: 176, 1938 (Sakarigalighat, Santal Parganas). Hora and Misra, *J. Bombay nat. His. Soc;* **43(2)**: 220, 1942 (Hindi names, distribution given as Poona). Hora, *Rec. Indian Mus;* **44(2)**: 196, 1942 (name only, distribution given as India, Burma and Sri Lanka). Macdonald, *J. Bombay nat. Hist. Soc;* **44**: 529, fig. 10, 1948 (name only). Hora, *J. zool. Soc. India,* **1**: 2, 1949 (name only, Rihand river, Mirzapur). Hora, *Proc. U.N. Sci. Conf. on Conservation and Utilization of resources,* **7**: 124, 1949. Hora, *J. Asiat. Soc. Beng;* **16(1)**: 51, 1950. Hora, *Curr. Sci;* **21(6)**: 164, 1952. (Mollusc

eating habits). Hora and Mathur, *Bull. nat. Inst. Sci. India,* (1): 32, 1952 (name only, Rajasthan). **Hora,** *Thapar commemeration Vol*; : 121, pl.1, 1953 (Mollusc eating habits). Menon, *Rec. Indian Mus;* **52(1)**: 22, 1956 (name only, list of fishes from Manipur). Motwani and David, *J. zool. Soc. India,* **9(1)**: 11, 1957 (River Sone, Bihar). Karamchandani, *Trop. Ecol;* **3(1&2)**: 80, 1962 (name only, Ganga river, Dighwara at Bihar). Bhuiyan, *Fish. Dacca,* : 22, fig. 1964 (synonymy, description and feeding habits). Menon, *Rec. Indian Mus;* **59(4)** (1961): 378, 1966 (Ponniyar river, Madukkarai, Pondicherry). Mirza and Naik, *Pakistan J. Sci. Res;* **19(2&3)**: 114, 1967 (Bolan dam, Baluchistan). Rajan, Patnaik and Basu, *J. zool. Soc. India,* **20(1&2)**: 83, 1968 (Chilka Lake, Northern sector). Dhawan, *J. Bombay nat. His. Soc;* **66(1)**: 192, 1969 (Udaipur Lake, Rajasthan). Datta and Majumdar, *Rec. zool. Surv. India,* **62(1&2)**: 82, 1970 (Rajasthan). Mirza, *Biologia,* **16(2)**: 77, fig.2, 1970 (River Ravi, Lahore). Sen *et al., Seafd. Expt. J;* **2(1)**: 3, 1970 (Bengali and English names, Calcutta). Islam and Siddiqui, *Biologia,* **17(1)**: 31, 1971 (Jhelum river, Pakistan). Menon *et al., Sci. Cult;* **38**: 342, 1972 (name only, list of fresh water fish from river Hooghly, West Bengal). Venkateswarlu and Rama Rao, *Seafd. Expt. J;* **5(6)**: 3, 1973 (Hindi and Bengali names of Gangetic fishes). Mirza and Ahmad, *Biologia,* **20(1)**: 100, 1974 (name only, Dikhan District, NWFP, Pakistan). Ataur Rahman, *Bangladesh J. Sci. Ind. Res;* **9(3&4)**: 200; 1974 (name only, checklist of Bangladesh fishes, with Bengali names). Mirza, *Biologia,* **20(1)**: 78, 1974 (name only, distribution in Baluchistan and Indus Plain, Pakistan). Menon, *Inl. Fish. Soc. India Spl. Publ;* **(1)**: 1974 (checklist of freshwater fishes of Indo-Gangetic Plain). Ataur Rahman, *Bull. Fw. Fish. Res. Sta;* **(1)**: 7, 1975 (name only, checklist of Bangladesh fishes, Bengali names). Mukherjee, *J. Bombay nat. Hist. Soc;* **72(1)**: 17, 1975 (Sundarbans). Rao, *Matsya,* **2**: 57, 1976 (name only, from Godavari estuary). Dutt and Murthy, *Mem. Soc. zool. Guntur,* **1**: 7, 1976 (name only, Lake Kolleru). Mirza, *Biologia,* **22(1)**, 115, 1976 (name only, list of fishes from Northern sub montane regions of Pakistan, with common names). Srivastava and Venkateswarlu, *Indian J. zool;* **7(3)**: 180, 1976 (name only, list of fishes of U.P. with local names; plains of U.P.). Venkateswarlu, *Acta Ichthyol. Piscat;* **6(1)**: 90, 1976 (name only, Patna District, Bihar). Murthy, *Proc. Indian Acad. Sci;* **85B(3)**: 36, pl.4, fig.2, 1977 (Lake Kolleru, description of the species). Pillai and Yazdani, *Rec. zool. Surv. India,* **72**: 11, 1977 (Someswari river at Baghmara, Garo hills, Meghalaya). Venkateswarlu, *Acta Ichthyol. Piscat;* **7**: 48, 1977 (name only, river Poonpun, Bihar). Sen, *Seafd. Expt. J;* **10(1)**: 3, 1978 (name only, Assam; with scientific, local and english names). Venkateswarlu and Menon, *Acta Ichthyol. Piscat;* **9(1)**: 57, 1979 (checklist of fishes of Ganges). Mirza, *Proc. Ist Pakistan Congr. Zool;* p.12, 1980 (name only, distribution in Pakistan and elsewhere; original names and Day's equivalent given). Jayaram, *HBk. Fw. Fish. India,* : 117, 121, 1981 (key to species; distribution; throughout India, Pakistan, Burma, Bangladesh and Nepal). Shrestha, *Fish. Nepal,* : 68, 1981 (Bagmati, Kamali and Lohandra rivers). Mirza, *Fish. Lahore,* p.2, 1982 (distribution). Lone, *Inland Fish. Aquacult. Pakistan,* : 42, 1983 (name only, distribution in Pakistan and elsewhere). Mirza and Omer, *Biologia,* **30(1)**: 79, 1984 (South Eastern parts of Baluchistan). Mirza and Ahamad, *Biologia,* **33(2)**: 257, 1987 (Bhere, Megha river Jelum Sarghosta District, Pakistan). John Singh and Vicram, *J. Bombay nat. Hist. Soc;* **84(3)**: 531, 1987 (Tambraparani and Shervalar, Papanasam, Manimuthar dam; introduced). Mirza and Abubakr, *Biologia,* **34(1)**: 46, 1988 (name only, Chasma Lake District, Pakistan). Mirza and Javeed Khan, *Biologia,* **34(1)**: 152, 1988 (Marala, River Chenab, Sialkhot District, Pakistan). Talwar and Jingran, *Inland Fish;* **1**: 203, 1991 (distribution).

Vernacular Names : *Kalabeinse, Kaliara, Mahlee* : ASSAME; *Kalbasu, Kundna, Kursha* : BENGALI; *Dai, Kalbasu* : GUJARATI; *Kalabeinse, Kalbasu, Karanchar* : HINDI; *Kaghi, Karimeenu, Machilu* : KANNADA; *Kartamin, Karthameenu, Kakkameenu* : MALAYALAM; *Kanas, Manoshi* : MARATHI; *Kalanchi, Kalabeinse* : ORIYA; *Di, Dhai, Kalahan, Kalabans* : PUNJABI; *Kakkameen, Karumsel, Kalselu, Karupu sel, Sal candee, Selkendai* : TAMIL; *Kakki bontha, Kakigondi, Kakobocha, Nallachithraya, Nallagandu Meenu* : TELUGU

Specimens studied : Total 37 examples, 80.5-400.0 mm in SL.

(1) SRS/ZSI unregistered four examples, 84.0-97.0 mm in SL; River Vettar at V.V.R. near Thenperambur village, 18 km west of Thanjavur town, Tamil Nadu. K.C. Jayaram, 26th March 1973.

(2) SRS/ZSI unregistered one example, 158.00 mm in SL; River Kudamurty at Rajagiri. K.C. Jayaram, 29th January 1974.

(3) SRS/ZSI unregistered one example, 113.0 mm in SL; river Cauvery below Mettur dam. T. Venkateswarlu, 19th February 1974.

(4) SRS/ZSI unregistered one example, 156.0 mm in SL; Fish market at Pandharpur, Maharashtra. K.C. Jayaram and party, 13th May 1988.

(5) SRS/ZSI unregistered one example, 106.0 mm in SL; Fish market at Jamkhandi. K.C. Jayaram, 18th May 1988.

(6) SRS/ZSI unregistered three examples, 82.0-132.0 mm in SL; River Krishna at Babaldi, 20 km from Jamkhandi, Bijapur district, Karnataka. K.C. Jayaram, 19th May 1988.

(7) SRS/ZSI unregistered two examples, 115.0-152.0 mm in SL; River Tungabhadra at Rajolibandha, 40 km south of Raichur, Karnataka. K.C. Jayaram and party, 24th May 1988.

(8) SRS/ZSI unregistered two examples, 80.5-81.0 mm in SL; river Krishna at Krishna agraharam, Gadwal, Andhra Pradesh. K.C. Jayaram, 29th May 1988.

(9) SRS/ZSI unregistered two examples, 124.0-146.0 mm in SL; Fish market at Kurnool, Andhra Pradesh. K.C. Jayaram and party, 31st May 1988.

(10) SRS/ZSI unregistered thirteen examples, 108.0-182.0 mm in SL; River Krishna at Lingalagattu, Andhra Pradesh. K.C. Jayaram and party, 3rd June 1988.

(11) SRS/ZSI one example. 181.0 mm in SL; River Krishna at Ramapuram, 21 km from Dachepally town, Guntur District, Andhra Pradesh. K.C. Jayaram, 22nd December 1988.

(12) SRS/ZSI unregistered two examples, 137.0-149.0 mm in SL; River Krishna at Digraj, 13 km south-west of Sangli town, Maharashtra. K.C. Jayaram and party, 29th December 1988.

(13) SRS/ZSI unregistered one example, 400.0 mm in SL; River Krishna at Satrasala. K.C. Jayaram and party, 27th March 1989.

(14) SRS/ZSI unregistered one example, 184.0 mm in SL; Madras Canal or West Main Canal at Sitanagaram; Vijayawada, Andhra Pradesh. K.C. Jayaram and party, 17th January 1990.

(15) SRS/ZSI unregistered one example, 103.0 mm in SL; River Tungabhadra at Nawab's bunglow, Kurnool, Andhra Pradesh. K.C. Jayaram, 13th March 1990.

(16) SRS/ZSI unregistered one example, 178.0 mm in SL; Fish market at Kurnool Andhra Pradesh. K.C. Jayaram, 14th March 1990.

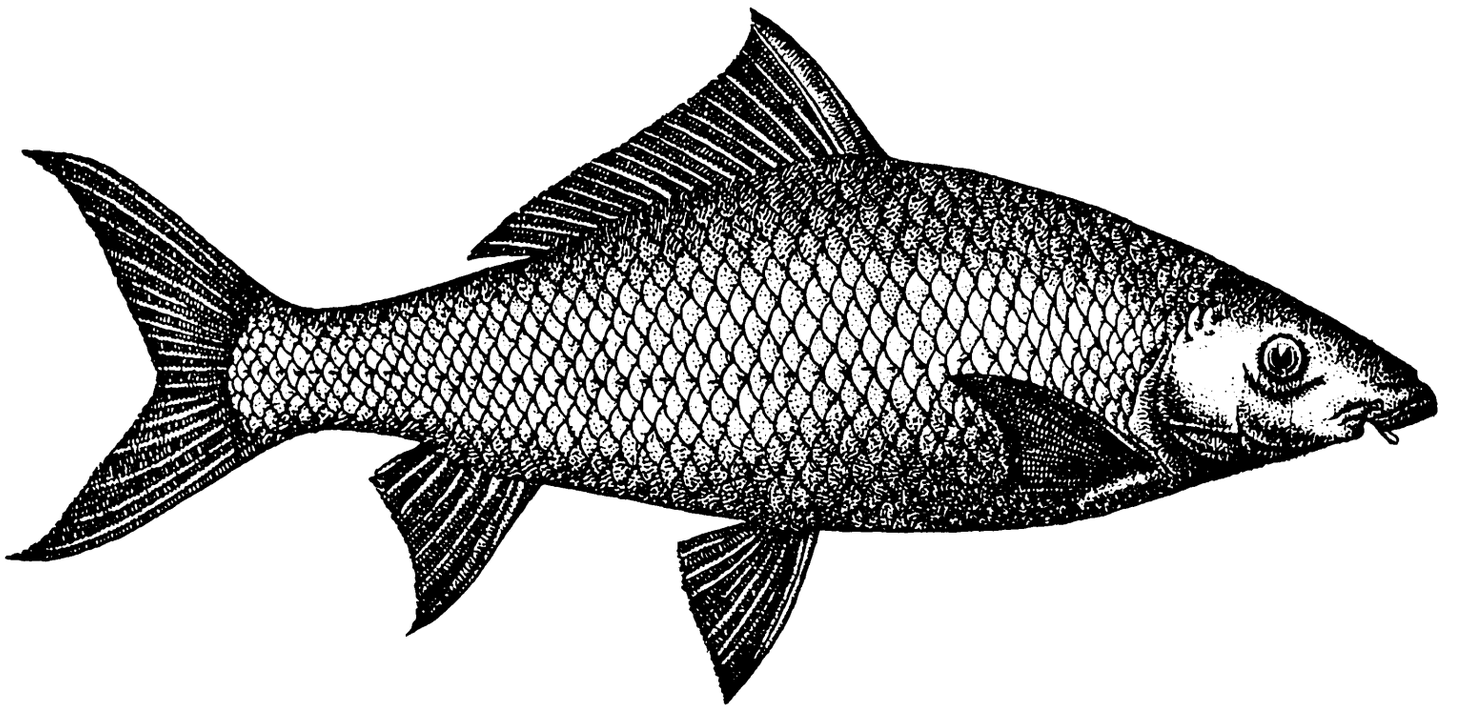

Fig. 19. *Labeo calbasu* (Hamilton)

Diagnosis : A *Labeo* with 15-18 dorsal fin rays. Lateral line scales 40-44. Snout edge fimbriated and both lips highly fringed and protruding. This fish is easily identified by its unusual charcoal black colour throughout body, with two fleshy black pairs of barbels (except in some specimens having dark brown flank).

Description : D. iii, 12-15; P. i, 15-16; V. i, 8;
A. ii or iii, 5; C. 10+9; Ll. 40-44.

Dorsal profile more arched than ventral, body rather deep and stout, its depth 30.2 (25.8-36.0), head length 25.3 (22.5-29.2) in percent of standard length. Head fairly large and conical, its width 63.3 (50.0-72.2), height at occiput 74.6 (66.7-83.3), snout length 41.3 (34.5-46.3), width of gape of mouth 27.5 (18.2-40.0), dorsal fin base 103.1 (50.0-126.6), eye diameter 24.3 (18.0-30.0) in percent of head length. Eye 59.5 (42.9-75.2) in percent of snout length, 53.8 (33.3-75.2) in percent of interorbital width. Snout obtuse, covered with pores in big specimens, with a lateral lobe. Mouth narrow, inferior. Both lips thick and fringed, lower lip more fringed than upper one; both continuous towards the corner of the mouth; each having distinct inner fold; postlabial groove continuous. barbels two pairs, rostral slightly longer than maxillary, fleshy.

Dorsal fin inserted nearer to tip of snout than caudal fin base, slightly in advance of the pelvic fin, outer margin concave. Pectoral fin inserted laterally, not reaching base of pelvic fin. Pelvic fin not extending to anal fin. Anal fin when laid flat does not reach base of caudal fin. Least depth of caudal peduncle, 85.5 (71.4-196.4) in percent of its length. Caudal fin forked.

Distribution : INDIA : Throughout except Kerala. PAKISTAN. NEPAL. BANGLADESH. MYANMAR and THAILAND.

Scales :

Lateral line scales	: 40-44
Predorsal scales	: 10-14
Prepelvic scales	: 22-26
Preanal scales	: 9-12
Dorsal fin/Ll.	: $7^1/_2$-$9^1/_2$
Pelvic fin/Ll.	: $5^1/_2$-$6^1/_2$
Anal fin/Ll.	: $5^1/_2$-$6^1/_2$
Circumpeduncular scales	: 18-23

Gill rakers : 9-14/31-36

Size : Maximum : 90.0 cm (TL)

Colour : Specimens collected from ponds are often charcoal black on dorsal and flank; fins also black; specimens from streams and rivers have scales with scarlet centre.

Relationship : Very close to *L. nigrescens;* differing from it in having a lesser number of lateral line scales (40-44 vs 36-37 in *Labeo nigrescens*). In *Labeo calbasu* the caudal peduncle is slender and long but in *L. nigrescens* it is short and stout. In colour also, *L. calbasu* differs from *L. nigrescens*; the former is of charcoal black while the latter is slaty or dusky.

The colour of the fish is variable though dark in most cases, a few specimens from Krishna were reddish though all other features were referable to *L. calbasu*. Murthy (1977) also reported the colour variation among the specimens collected from the Lake Kolleru and Godavari river.

ADDITIONAL DATA

Table : Non-meristic Characters

Labeo calbasu (Hamilton)

	Ratio	Mean	SD	Percentage	Mean	n
	Range			Range		
SL/Body depth	2.9 3.9	3.3	0.28	25.8 - 36.0	30.2	37
SL/LH	3.4 4.4	3.9	0.22	22.5 - 29.2	25.3	37
SL/Predorsal length	1.8 2.7	2.3	0.19	37.3 - 54.1	48.3	37
SL/Preanal length	1.2 1.4	1.3	0.03	73.5 - 82.6	78.1	37
SL/Prepelvic length	1.8 2.1	1.9	0.06	48.5 - 56.5	52.6	37
Snout/Eye	1.3 2.3	1.9	0.23	42.9 - 75.2	59.5	37
Iow/Eye	1.3 3.0	1.9	0.43	33.3 - 75.2	53.8	37
LH/Eye	3.3 5.5	4.1	0.49	18.0 - 30.0	24.3	37
LH/Snout	2.2 2.9	2.4	0.18	34.5 - 46.3	41.3	37
LH/Head width	1.3 2.0	1.6	0.13	50.0 - 75.2	63.3	37
LH/HT. at occpt.	1.2 1.5	1.4	0.08	66.7 - 83.3	74.6	37
LH/Width of mouth	2.5 - 5.5	3.6	0.54	18.2 - 40.0	27.5	37
LH/LCPD	1.3 2.0	1.6	0.17	50.0 - 75.7	61.7	37
LH/HCPD	1.3 - 2.2	1.8	0.19	46.5 - 78.1	53.4	37
LH/Dorsal fin base	0.8 - 2.0	0.9	0.19	50.0 - 126.6	103.1	37
LCPD/HCPD	0.9 1.4	1.2	0.10	71.4 - 106.4	85.5	37

Labeo nandina (Hamilton)

(Fig. 20)

Cyprinus nandina, Hamilton, *Fish. Ganges*, : 300, 388, pl.8, fig.84, 1822 (type-locality : Mahananda river).

Cirrhinus nandina, McClelland, *Asiat. Res;* **19**: 265, 269, pl.41, fig.1, 1839 (Bengal and Assam).

Cirrhinus macronotus, McClelland, *Asiat. Res;* **19**: 318, 319, 1839 (type-locality ; Assam).

Rohita nandina, Valenciennes (in Cuvier and Valenciennes), *Hist. nat. Poiss;* **16**: 244, pl.473, 1842.

Labeo macronotus, Gunther, *Cat. Fish. Brit. Mus;* **7**: 52, 1868 (North Bengal and Assam).

Labeo nandina, Gunther, *Cat. Fish. Brit. Mus;* **7**: 51, 1868 (North Bengal and Irrawady). Bevan, ***HBk***,

Fw. Fish. India, : 161, 1877 (Bengal and Assam). Day, *Fish. India,* : 535, pl.126, fig. 1 & 2, 1877 (Bengal, Assam and Burma). Day, *Fauna. Brit. Ind. Fish;* **1**: 258, 1899 (description of species and distriution as Bengal, Assam and Burma). Shaw and Shebbeare, *J. Asiat. Soc. Beng;* **3**: 55, pl.5 fig.12, text-fig.52, 1937 (North Bengal). Bhuiyan, *Fish. Dacca,* : 26, fig.1964 (synonymy, description and feeding habits). Sen, Dasgupta and Rama Rao, *Seafd. Expr. J;* **2(1)**: 3, 1970 (Bengali and English names of Calcutta fishes). Venkateswarlu and Rama Rao, *Seafd. Expt. J;* **5(6)**: 3, 1973 (Bengali names of Gangetic fishes). Ataur Rahman, *Bangladesh J. Sci. Ind. Res;* **9(3&4)**: 200, 1974 (name only, checklist of Bangladesh fishes, Bengali names). Menon, *Inl. Fish. Soc. India Spl. Publ;* **(1)**: 34, 1974 (checklist of freshwater fishes of Indo-Gangetic Plain). Ataur Rahman, *Bull. Fw. fish. Res. Sta;* **(1)**: 7, 1975 (name only, checklist of Bangladesh fish, Bengali names). Sen, *Seafd. Expt. J;* **10(1)**: 3, 1978 (name only, Assam, scientific, local and English names). Venkateswarlu and Menon, *Acta Ichthyol. Piscat;* **9(1)**: 51, 1979 (checklist of fishes of Ganges). Jayaram, *HBk. Fw. Fish. India,* : 119, 1981 (key to species). Talwar and Jhingran, *Inland fish;* **1**: 214, 1991 (West Bengal and Assam. Bangladesh and Burma).

Vernacular Names : Nandani: ASSAME; Nandan, Nandi : BENGALI

Specimens studied : Total four examples, 114.5-207.0 mm in SL.

(1) ZSI F 674 one example, 163.0 mm in SL; Mandalay, Burma.

(2) ZSI F 672 two examples, 114.5-131.5 m in SL; Mandalay, Burma.

(3) ZSI F 197 one example, 207.0 mm in SL; Mandalay, Burma, Major Sladen.

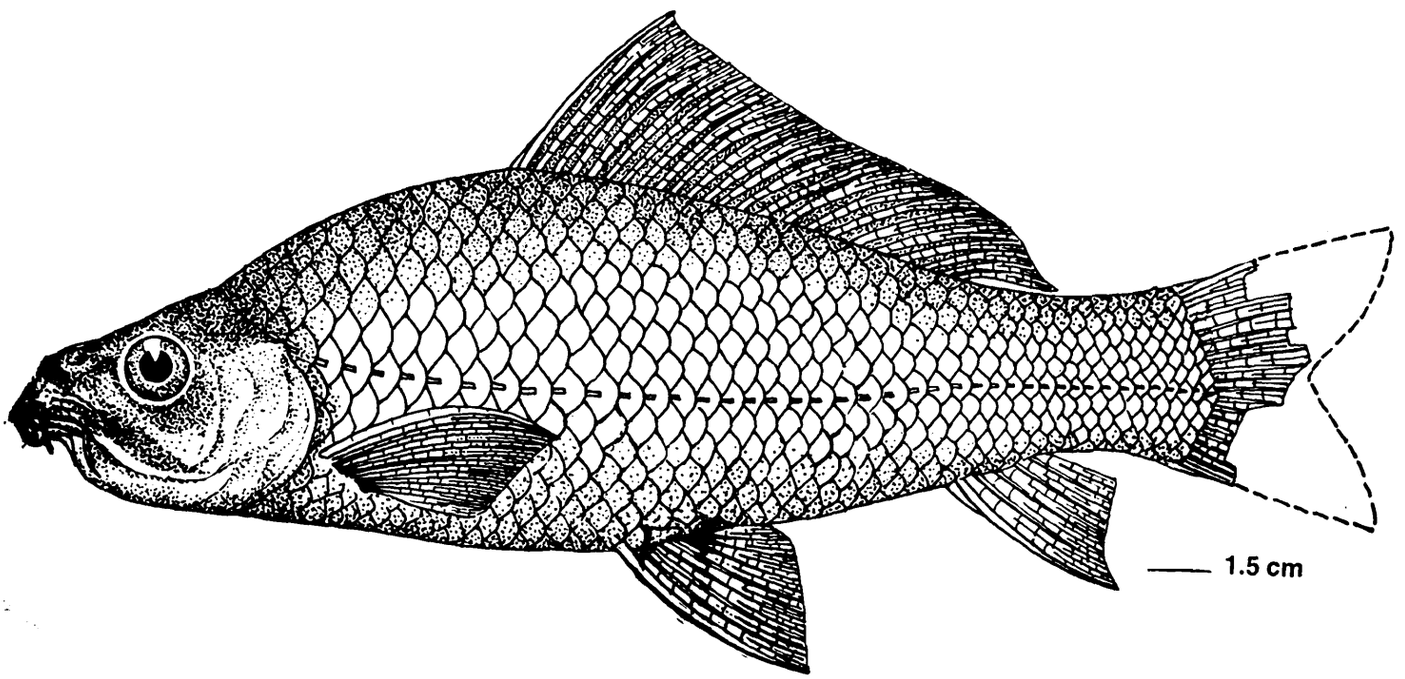

Fig. 20. *Labeo nandina* (Hamilton)

Diagnosis : A *Labeo* with 24-27 dorsal fin rays. 42-44 lateral line scales. Snout without lateral lobe.

Description : D. ii or iii, 22-24; P. i, 17; V. i, 8;
A. ii, 5; C. 10+9; Ll. 42-44

Body deep, dorsal profile more convex than ventral, body depth 33.2 (29.3-37.4), head length 28.2 (26.2-30.1) in percent of standard length. Head moderate, width 62.5 (57.8-67.1), height at occiput 66.3 (55.6-76.9), snout length 39.9 (39.8-40.0), width of gape of mouth 22.9 (20.4-25.4), dorsal fin base 145.6 (129.9-161.3), eye diameter 22.2 (18.4-26.1) in percent of head length. Eye 58.5 (45.5-71.4) in percent of snout length, 42.4 (34.7-50.0) in percent of interorbital width. Snout obtuse, slightly projecting beyond the jaws, no lateral lobe; a few pores on the snout. labial fold continuous across the lower jaw, lower lip more fimbriated than upper, both with distinct inner fold. Postlabial groove continuous. Barbels two pairs, rostral and maxillary, short.

Dorsal fin inserted midway between the tip of snout and end of the base of anal fin. Pectoral fin do not reach pelvic fin. Pelvic fin inserted below the ninth dorsal ray and not extending to anal fin. Anal fin when laid flat not reaching base of caudal fin. Least depth of caudal peduncle 73.0 (64.1-82.0) in percent of its length. Caudal fin forked.

Distribution : INDIA : Assam and West Bengal. BANGLADESH and MYANMAR.

Scales :

Lateral line scales	: 42-43
Predorsal scales	: 12
Prepelvic scales	: 10-11
Preanal scales	: 25
Dorsal fin/Ll.	: $7^{1}/_{2}$-8
Pelvic fin/Ll.	: 6
Anal fin/Ll.	: 6
Circumpeduncular scales	: 21-22

Gill rakers : 8-9/27-28.

Size : Maximum : 26.0 cm. (TL)

Colour : Dark greenish above, becoming lighter on the sides and beneath, a cloudy patch along the sides, mid of the scales often with reddish lunule; in spirit preserved specimens, body brownish.

Relationship : Close to *Labeo fimbriatus*; differentiated by its unique large number of dorsal fin rays 24-27 (vs. 17-22 in *Labeo fimbriatus*). SL/Body depth 29.3-37.4 (vs 30.5-40.5 in *L. fimbriatus*).

Remarks : Though this fish was first reported from the Ganges by Hamilton (1822) and subsequently in 1877 by Day, its abundance in the river system has declined due to habitat destruction. Very few examples are reported during any major haul.

ADDITIONAL DATA

Table : Non-meristic Characters

Labeo nandina (Hamilton)

	Ratio Range	Mean	SD	Percentage Range	Mean	n
SL/Body depth	2.7 3.4	3.0	0.35	29.3 - 37.4	33.2	4
SL/LH	3.3 3.4	3.35	0.22	26.2 - 30.1	28.2	4
SL/Predorsal length	2.1 2.4	2.2	0.12	43.5 - 47.4	45.4	4
SL/Preanal length	1.2 1.4	1.3	0.08	72.5 83.3	77.9	4
SL/Prepelvic length	1.8 - 2.0	1.9	0.10	50.0 - 56.8	53.4	4
Snout/Eye	1.4 - 2.2	1.7	0.33	45.5 - 71.4	58.5	4
Iow/Eye	2.0 2.9	2.4	0.43	34.7 - 50.0	42.4	4
LH/Eye	3.8 5.4	4.6	0.74	18.4 - 26.1	22.2	4
LH/Snout	2.5 - 2.7	2.6	0.11	39.8 - 40.0	39.9	4
LH/Head width	1.5 - 1.7	1.6	0.11	57.8 67.1	62.5	4
LH/HT. at occpt.	1.3 - 1.8	1.4	0.26	55.6 - 76.9	66.3	4
LH/Width of mouth	3.9 - 4.9	4.4	0.40	20.4 - 25.4	22.9	4
LH/LCPD	1.4 - 2.0	1.7	0.23	51.0 - 70.9	61.0	4
LH/HCPD	2.1 - 2.6	2.4	0.22	38.1 - 46.9	42.5	4
LH/Dorsal fin base	0.6 - 0.7	0.71	0.06	129.9 - 161.3	145.6	4
LCPD/HCPD	1.2 - 1.6	1.4	0.14	64.1 - 82.0	73.0	4

Labeo rohita (Hamilton)

(Fig. 21)

Cyprinus rohita Hamilton, *Fish. Ganges,* : 301, 388, pl.36, fig. 85, 1822 (type-locality : Gangetic Provinces). McClelland, *Asiat. Res;* **19**: 266, 391, pl.41, fig,2, 1839 (Bengal and Assam).

Rohita buchanani, Valenciennes (in Cuvier and Valenciennes), *Hist. nat. Poiss;* **16**: 251, 1842. Bleeker, *Verh, Bat, Gen;* **25**: 133, 1853.

Rohita duvacelii, Valenciennes (in Cuvier and Valenciennes), *Hist. nat. Poiss;* **16**: 262, 1842.

Labeo rohita, Gunther, *Cat. Fish. Brit. Mus;* **7**: 55, 1868 (freshwaters of East Indian continent). Beavan *HBk. Fw. Fish. India,* : 63, 1877 (India generally). Day, *Fish. India,* : 538, pl.127, fig.4, 1877 (description of species, distribution as fresh waters of Sind, from Punjab through India and Assam to

Burma). Day, *Fauna. Brit. Ind. Fish;* **1**: 262, 1889 (Sind, Punjab, Assam to Burma). Chaudhuri, *Rec. Indian Mus;* **6**: 15, 1911 (Sind, Punjab to Assam and Burma). Chaudhuri, *Rec. Indian Mus;* **9**: 81, 82, 1913. Hora, *Rec. Indian Mus;* **22**: 644, 1921. Hora, *Rec. Indian Mus;* **24**: 43, 67, 1922 (description, distribution as Eastern Tibet). Annandale and Hora, *Rec. Med. Gaz;* **62**: 188, 1927. Prashad and Mukerji, *Rec. Indian Mus;* **31**: 193, 1929 (Indawgyi Lake, Burma). Hora, *Curr. Sci;* **1(2)**: 385, 1933 (Uttarbagh, West Bengal). Mukerji, *Rec. Indian Mus;* **37**: 259, 260, 1935 (Andaman islands, introduced). Hora, *Rec. Indian Mus;* **38**: 212, 1936. Hora, *Rec. Indian Mus;* **39**: 255, 1937. Shaw and Shebbeare, *J. Asiat. Soc. Bengal;* **3**: 57. Text-fig.54, 1937 (deep pool in clear streams, North Bengal). Mukerji and Hora, *Health Bull;* **(12)**: 39, pl.6, 1938 (larvicidal properties). Nair, *Rec. Indian Mus;* **42(2)**: 25, 1940 (blind fish from Dumdum market, Calcutta). Hora, *Rec. Indian Mus;* **42(1)**: 39, 1949. Hora, *J. Bombay nat. Hist. Soc;* **41(4)**: 790, pl.3, 1940 (bottom feeding habits and suctorial action of mouth indicated). Nazir Ahmad, *Bull. Punjab Univ. Dept. Zool;* **1**: 272, fig.7, 1943 (Ravi river, Lahore). Hora, *Proc. Indian Sci. Congr;* **30(3)**: 65, 1943. Hora, *Sci, Cult;* **8**: 325, 326, 1943. Hora and Nair, *Proc. nat. Inst. Sci. India,* **10(4)**: 441, 1944. Hora, *J. Cent. Bd. Irrig;* **4**: 340, 1947. Macdonald, *J. Bombay nat. Hist. Soc;* **44**: 527, fig.9, 1948. Hora, *J. zool. Soc. India,* **1**: 3, 1949. Hora, *J. Asiat. Soc. Beng;* **16(1)**: 51, 1950. Hora, *J. Asiat. Soc. Beng;* **17(2)**: 160, pl.4, 1951. Hora, *Curr. Sci;* **20**: 173, 1951. Hora, *Thapar Commemoration Vol;* p.120, pl.1, 1953. David, *Indian J. fish;* **1**: 252, 1954 (Hooghly river, Pulta waterworks, Barrackpur, West Bengal). Hora, *J. Asiat. Soc. Beng;* **20(1)**: 19, 1954. Hora, *J. Asiat. soc. Beng;* **21(1)**: 1, 4, 5, pl.5, 1955. Saraswathi and Hora, *J. Asiat. Soc. Beng;* **21(1)**: 18, 19, 1955. Job, David and Das, *Indian J. Fish;* **2(1)**: 33, 1955 (frequent in Mahanadi river, near Hirakud dam, Orissa). Pillay and Hora, *Fish Biol. Tech. Pap;* **(14)**: 20, 49, 1962. Motwani and David, *J. zool. Soc. India,* **9(1)**: 1, 1957 (Sone river, Bihar). Misra, *Rec. Indian Mus;* **57**: 162, 1959 (throughout India). Karamchandani, *Trop. Ecol;* **3(1&2)**: 80, 1962 (name only, Ganga river at Dighwara in Bihar). Bhuiyan, *Fish. Dacca,* : 20, fig.1, 1964 (synonymy, description and food habits). Mirza and Naik, *Pakistan J. Sci. Res;* **19(2&3)**: 114, 1967 (Bolan dam, Baluchistan). Srivastava, *Fish. East. U.P.;* : 44, fig. 27, 1968. Dhawan, *J. Bombay nat. Hist. Soc;* **66(1)**: 192, 1969 (Udaipur Lake, Rajasthan). Datta and Majumdar, *Rec. zool Surv. India,* **60(1&2)**: 83, 1970 (Rajasthan). Mirza, *Biologia,* **16(2)**: 79, 1970 (River Ravi, Lahore). Sen *et al; Seafd. Expt. J;* **2(1)**: 3, 1970 (Bengali and English names, Calcutta). Menon *et al; Sci. cult;* **38**: 342, 1972 (name only, list of freshwater fishes from river Hooghly, West Bengal). Mirza, *Biologia,* **18(2)**: 164, 1972 (South-eastern parts of Baluchistan). Venkateswarlu and Rama Rao, *Seafd. Expt. J;* **5(6)**: 3, 1973 (Hindi and Bengali names, Gangetic fishes). Menon, *Inl. Fish. Soc. India Spl. Publ;* **(1)**: 1974 (checklist of freshwater fishes of Indo-Gangetic plain). Mirza and Ahmad, *Biologia,* **20(1)**: 100, 1974 (name only, Dikhan District, N.W.F.P. Pakistan). Ataur Rahman, *Bangladesh J. Sci. Ind. Res;* **9(3&4)**: 200, 1974 (name only, checklist of Bangladesh fishes, Bengali names). Mirza, *Biologia,* **20(1)**: 78, 1974 (name only, distribution in Baluchistan and Indus Plain in Pakistan). Ataur Rahman, *Bull. Fw. Fish. Res. Sta;* **1**: 7, 1975 (name only, checklist of Bangladesh fishes in Bengali names). Karamchandani and Pandit, *J. Bombay nat. Hist. Soc;* **72(1)**: 215, 1975 (Narbada river). Mirza, *Bijdr. Dierk;* **45(2)**: 172, 1975 (distribution in Pakistan, Indus Plain only). Mukerjee, *J. Bombay nat. Hist. Soc.* **72**: 17, 1975 (Sundarbans, West Bengal). Rao, *Matsya,* **2: 57, 1976** (name only, Godavari estuary). Dutt and Murthy, *Mem. zool. Soc. Guntur;* **1**: 7, 1976 (name only, Kolleru Lake, local names). Mirza, *Biologia,* **22(1)**: 115, 1976 (name only, list of fishes from Northern Montane and submontane regions of Pakistan with common names). Srivastava and Venateswarlu, *Indian J. zool;*

17(3): 180, 1976 (name only, list of fishes from U.P. with local names, plains of U.P.). Venkateswarlu, *Acta Ichthyol. Piscat;* **6(1)**: 91, 1976 (Patna District, Bihar). Murthy, *Proc. Indian Acad. Sci;* **85B**(3): 138, pl.4, fig.4, 1977 (Lake Kolleru, description of species). Venkateswarlu, *Acta Ichthyol. Piscat;* **7**: 48, 1977 (name only, river Poonpun, Bihar). Sen, *Seafd. Expt. J;* **10(1)**: 3, 1978 (name only, Assam; with scientific, local and English names). Khan and Kamal, *J. Bombay nat. Hist. Soc.;* **76(3)**: 532, 1979 (River Kosi in Bihar). Venkateswarlu and Menon, *Acta Ichthyol, Piscat;* **9(1)**: 52, 1979 (checklist of fishes of Ganges). Mirza, *Proc. Ist Pakistan Congr. Zool;* p.12, 1980 (name only, distribution in Pakistan and elsewhere, original name and Day's equivalent given). Jayaram, *HBk. Fw. Fish. India,* : 120, fig.58, 1981 (key to species). Shrestha, *Fish Nepal,* : 77, 1980 (Bagmati and Lohandra rivers, Nepal). Jayaram *et al; Rec. zool. Surv. India Occ. Pap;* **(36)**: 71, 1982 (River Cauvery). Mirza, *Fish. Lahore,* : 8, fig.1, 1982 (distribution). Lone, *Inland Fish. Aquacult. Pakistan,* : 42, 1983 (name only, distribution in Pakistan and elsewhere). Lipton, *Matsya,* **9&10**: 113, 1983-84 (Tripura). Mirza and Omer, *Biologia,* **30(1)**: 79, 1984 (South eastern parts of Pakistan). Talwar and Jhingran, *Inland Fish;* **1**: 219, 1991 (Pakistan, North and Central India. Bangladesh. Terai of Nepal and Burma).

Labeo horai, Fowler, *Proc. Acad. nat. Sci. Philad;* **76**: 95, fig.8, 1924 (type-locality : Sutlej river near Ludhiana, Punjab).

Vernacular Names : *Rohiti, Rui, Row* : ASSAME; *Ruee, Rui* : BENGALI; *Rohu* : HINDI; *Rohitham* : MALAYALAM; *Thambada massa* : MARATHI; *Rohu* : NEPALI; *Rohu, Ruha* : ORIYA; *Dhambra, Rohu, Topsa* : PUNJABI; *Kannadi kendai* : TAMIL; *Rakendi* : TELUGU

Specimens studied : Total 32 examples, 75.0-236.0 mm in SL.

(1) SRS/ZSI unregistered two examples, 120.0-133.0 mm in SL; river Cauvery at Karur, Trichy district, Tamil Nadu. K.C. Jayaram and party, 23rd March 1973.

(2) SRS/ZSI unregistered two examples, 75.0-170.0 mm in SL; Breeding ponds, State Fisheries Department, Sathanur Dam, North Arcot District, Tamil Nadu. T. Venkateswarlu, 27th July 1979.

(3) SRS/ZSI unregistered one example, 180.0 mm in SL; river Pennar, Mylavaram, Cuddapah District, Andhra Pradesh. T. Venkateswarlu, 29th June 1983.

(4) SRS/ZSI unregistered one example, 207.0 mm in SL; River Krishna at Krishna agraharam at Gadwal, Andhra Pradesh. K.C. Jayaram and party, 29th May 1988.

(5) SRS/ZSI unregistered nine examples, 147.0-192.0 mm in SL; Fish market at Two-Town, Vijayawada, Andhra Pradesh. K.C. Jayaram and party, 3rd July 1989.

(6) SRS/ZSI unregistered one example, 188.0 mm in SL; River Krishna at Nagaleru, 10 km south of Avanigadda, Krishna district, Andhra Pradesh. K.C. Jayaram and party, 4th July 1989.

(7) SRS/ZSI unregistered four examples, 124.0-158.0 mm in SL; Eluru canal near Satyanarayanapuram, Vijayawada, Andhra Pradesh. K.C. Jayaram and party, 18th January 1990.

(8) SRS/ZSI unregistered two examples, 137.5-164.0 mm in SL ; Fish market at Machalipatnam, Andhra Pradesh. K.C. Jayaram and party, 23rd January 1990.

(9) SRS/ZSI unregistered three examples, 191.0-217.0 mm in SL; Fish market at Kurnool, Andhra Pradesh. K.C.Jayaram and party, 14th March 1990.

(10) SRS/ZSI unregistered six examples, 92.0-153.0 mm in SL; Fish market at Two-Town, Vijayawada. Andhra Pradesh K.C. Jayaram and party, 19th march 1990.

(11) SRS/ZSI unregistered, one example, 236.0 mm in SL; Cauvery Peak Lake, Yercaud, Salem District, Tamil Nadu. Mrs. T.J. Indra, 23rd April 1990.

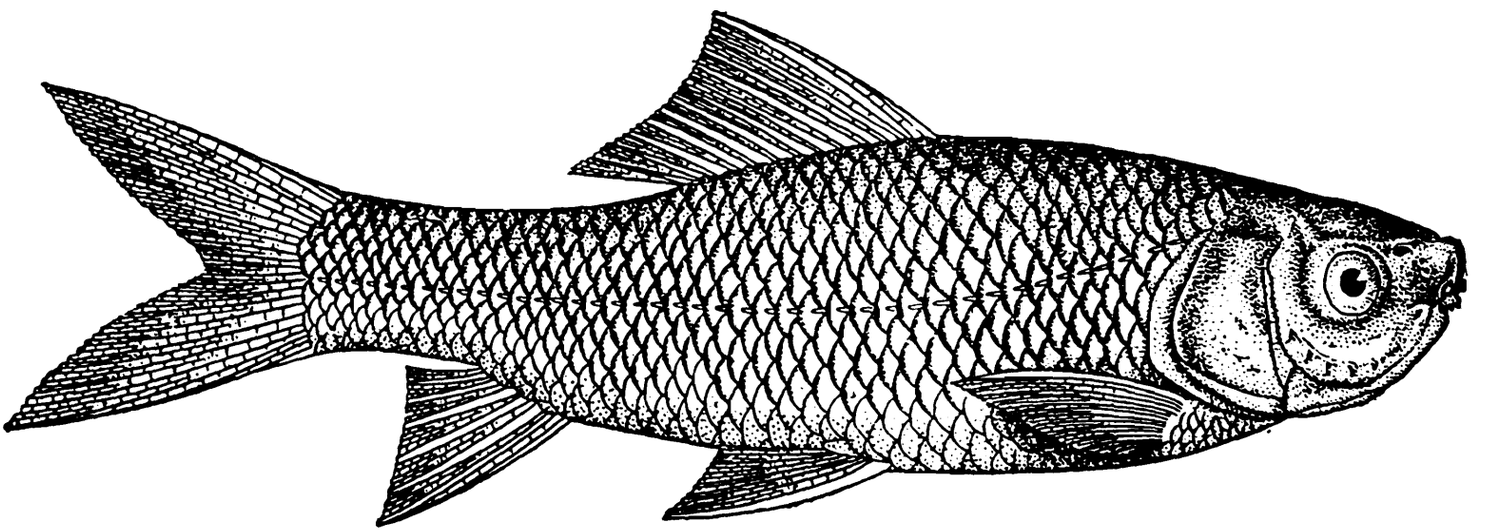

Fig. 21. *Labeo rohita* (Hamilton)

Diagnosis : A *Labeo* with an overhanging but obtuse, relatively small snout; no lateral lobe, isthmus rounded; a depression towards the postlabial groove. Four barbels; in young specimens rostral barbels absent.

Description : D. ii or iii, 12-14; P. 1, 15-16; V. i. 8;
A. ii or iii, 5; C. 10+9; Ll. 40-43.

Dorsal profile more convex.than of abdomen, body oblong, its body depth 31.6 (24.8-38.5), head length 29.5 (26.2-32.9) in percent of standard length. head moderate, width 58.1 (48.5-

67.6), height at occiput 71.1 (64.1-78.1), snout length 30.3 (22.5-38.0), width of gape of mouth 23.6 (17.1-30.0), dorsal fin base 85.2 (55.5-114.9), eye diameter 21.4 (16.4-26.4) in percent of head length. Eye 65.5 (46.9-84.0) in percent of snout length, 48.7 (30.8-66.7) in percent of interorbital width. Barbels often two pairs but rostral pair absent in young specimens. Snout produced and depressed, no tubercles; rostral fold covers the upper lip, no lateral lobe. Lips thin and fringed with a transverse inner fold above and below. Postlabial groove uninterrupted.

Dorsal fin inserted midway between snout-tip and base of caudal fin. Pectoral fin shorter than head not reaching pelvic fin. Pelvic fin does not reach anal fin. Anal fin when laid flat not reaching caudal fin base. Caudal fin deeply forked. Least depth of caudal peduncle 81.0 (69.0-93.4) in percent of its length.

Distribution : INDIA : Throughout. PAKISTAN. NEPAL. BANGLADESH. MYANMAR and SRI LANKA.

Scales :

Lateral line scales	: 40-43
Predorsal scales	: 13-15
Prepelvic scales	: 10-12
Preanal scales	: 23-26
Dorsal fin/Ll.	: $7^1/_2$-8
Pelvic fin/Ll.	: $5^1/_2$-$6^1/_2$
Anal fin/Ll.	: $5^1/_2$-$6^1/_2$
Circumpeduncular scales	: 20-22

Gill rakers 13-20/42-60.

Size : Maximum : 75.0 cm (TL).

Colour : In life, bluish along back, becoming silvery on the sides and beneath. Rim of iris red. Fins greyish or dark. When preserved in formalin, the back black, sides become brownish. Fins dusky. Each scale edge has a deep brown tinge.

Relationship : Allied to *L. dussumieri* (Valenciennes); distinguished from it by the number of dorsal fin rays. SL/Body depth 24.8-38.5 (vs 22.4-29.4), and in colour. *L. rohita* is black above and sides, becoming silvery ventrally, whereas in *L. dussumieri* body is olive green in the dorsal region, becoming silvery towards belly with 8-9 brownish stripes often seen from shoulder to caudal peduncle above and below the lateral line.

Remarks : Fowler (1924) described a fish from two specimens collected by Rev. Carletoni from Sutlej River near Ludhiana; under a new name *L. horai*. From the text-figure, the measurements and from the brief description it is clear that the fish is nothing but the widely distributed *L. rohita*.

While discussing the presence of rostral barbels, Misra (1959) stated that a thin pair of rostral is rarely present in *L. rohita*. Srivastava (1968) and Shrestha (1981) have reported only one pair of maxillary barbels, but present study reveals that there are two pairs of barbels, rostral and maxillary, in the adult. In young specimens the rostral barbel is lacking. This fish was introduced in Sri Lanka in 1981 (Ilukumbura, 1986 and Pethyiagoda, 1991).

ADDITIONAL DATA

Table : Non-meristic Characters

Labeo rohita (Hamilton)

	Ratio	Mean	SD	Percentage	Mean	n
	Range			Range		
SL/Body depth	2.6 4.0	3.4	0.38	24.8 - 38.5	31.6	32
SL/LH	3.0 3.8	3.3	0.19	26.2 - 32.9	29.5	32
SL/Predorsal length	1.9 2.1	2.0	0.06	46.9 53.2	30.1	32
SL/Preanal length	1.1 - 1.3	1.2	0.50	75.7 - 89.3	82.5	32
SL/Prepelvic length	1.7 2.0	1.8	0.06	50.5 - 57.8	54.1	32
Snout/Eye	1.2 2.1	1.7	0.26	46.9 - 84.0	65.5	32
Iow/Eye	1.5 - 3.2	2.5	0.38	30.8 - 66.7	48.7	32
LH/Eye	3.8 - 6.1	5.0	0.59	16.4 - 26.4	21.4	32
LH/Snout	2.6 - 4.4	3.1	0.35	22.5 - 38.0	30.3	32
LH/Head width	1.5 2.1	1.7	0.13	48.5 - 67.6	58.1	32
LH/HT. at occpt.	1.3 - 1.6	1.4	0.07	64.1 - 78.1	71.1	32
LH/Width of mouth	3.3 - 5.8	4.6	0.75	17.1 - 30.0	23.6	32
LH/LCPD	1.6 - 2.5	1.9	0.17	40.8 - 62.9	51.8	32
LH/HCPD	1.9 - 2.6	2.3	0.17	37.8 - 52.1	44.9	32
LH/Dorsal fin base	0.8 - 1.8	1.3	0.16	55.5 - 114.9	85.2	32
LCPD/HCPD	1.1 - 1.5	1.2	0.07	69.0 - 93.4	81.0	32

Group - VI
THE *ARIZA* GROUP

This group comprises the following species :

1. *Labeo ariza* (Hamilton, 1807, p.344)
2. *Labeo bata* (Hamilton, 1822, p.263)

3. *Labeo macmahoni* Zuymayer, 1912, p.597
4. *Labeo nigripinnis* Day, 1878, p.535

Common characters of these species are below :

1. Snout with no lateral lobe
2. Rostral fold not fleshy
3. Lips continuous at the angle of mouth
4. A pair of maxillary barbels (exception *L. macmahoni*)
5. Dorsal fin with ii or iii unbranched rays; not more than 9 branched rays (exception *L. macmahoni*)
6. Scales between pelvic fin and lateral line $4^1/_2$-$6^1/_2$

Following is a comparative table of the differences between the three species of the group :-

	Dorsal fin	Ll. scales	Predorsal scales	Prepelvic scales	Preanal scales	Dorsal fin/Ll.	Pelvic fin/Ll.	Anal fin/Ll.	Circum-peduncular scales
L. ariza (Hamilton)	ii, 9	38-39	12-13	8-10	23-24	$7^1/_2$	$5^1/_2$-$6^1/_2$	$5^1/_2$-$6^1/_2$	18-19
L. bata (Hamilton)	ii, 9-10	37-40	12-15	10-11	22-25	7-$8^1/_2$	6-$6^1/_2$	6-7	19-21
L. macmahoni Zugmayer	ii, 8	35-36					$4^1/_2$		
L. nigripinnis Day	ii, 9	40-42	15	10	26	$7^1/_2$-8	5-$5^1/_2$	6	20

Labeo ariza (Hamilton)

(Fig. 22)

Cyprinus ariza Hamilton, *Journey Mysore,* **3**: 344 pl.1, 1807 (type-locality : Vedawati river, Mysore). Hamilton, *Fish. Ganges,* : 286, 386, 1822 (Peninsula of India); McClelland, *Ind. Cyp;* : 279, 357, 1839. Cuvier and Valencennes, *Hist. nat. Poiss;* **16**: 430, 1842.

Tylognathus ariza, Gunther, *Cat. Fish. Brit. Mus;* **7**: 63, 1868 (Peninsula of India).

Labeo ariza, Day. *Fish. India,* : 544, pl.132, fig.5, 1877 (Wynaad and Bowany river at the foot of the Neilgherry hills in Madras, also the Cauvery river). Beavan, *HBk. Fw. Fish. India,* : 65, 1877 (India generally). Day, *Fauna Brit. Ind. Fish;* **1**: 272, 1889 (Wynaad, the Bhavani river at the foot hills of Nilgiris and the Cauvery river). Hora, *Rec. Indian Mus;* **44(2)**: 196, 1941 (Mysore, neighbouring hill ranges of Nilgiris, Wynaad and Coorg). Setna and Kulkarni, *J. Bombay nat. hist. Soc;* **46**: 128, 1946 (Ahmedabad). Chauhan, *Rec. Indian. Mus;* **45**: 276, 1947 (Patna state, Orissa). Misra (in part), *J. zool. Soc. India,* **1**: 144, 1949 (systematic status). Menon, *Proc. nat. Inst. Sci. India,* **18(6)**: 484, 1950 (Mahanadi river, Eastern ghats). David, *J. zool. Soc. India,* **5(2)**: 253, 1953 (quoted from Chauhan's 1947 report). Chauhan and Ramakrishna, *Rec. Indian Mus;* **51**: 1953 (Tel river and Belgaon, Orissa). Ranade, *J. Bombay nat. Hist. Soc.;* **51**: 473, 1953 (Baroda, Gujarat; reported first time from Baroda). Job, David and

Das, *Indian J. Fish;* **2(7)**: 33, 1955 (Hirakud dam, Mahanadi; quoted as recorded by Chauhan). David, *Proc. nat. Acad. Sci. India,* **33B(2)** [1947] : 278, 1963 (quoted as David recorded in 1957 from River Krishna). Jayaram, *HBk. Fw. Fish. India,* : 120, 1981 (key to species). Jayaram *et al; Rec. zool. Surv. India Occ. Pap;* **(36)**: 68, 1982 (Cauvery river). Venkateswarlu, *Rec. zool. Surv. India Occ. Pap;* **(56)** : 33, 1984 (Vernacular names for Day's equivalent). Venkateswarlu and Rama Rao, *Rec. zool. Surv. India Occ. Pap;* **(87)** : 11, 1986 (correct name for Day's equivalent). Talwar and Jhingran, *Inland Fish;* **1**: 198, 1991 (Peninsular India : Nilgiri hills, Wynaad and Cauvery river system).

Vernacular Names : *Bhagna* : GUJARATI; *Kaudasha* : MARATHI; *Coal, Coalkendai, Kolarinjan* : TAMIL

Specimens studied : Total eight examples, 65.0-213.0 mm in SL.

(1) ZSI F 4652 four examples, 65.0-71.50 mm in SL; River Krishna at Nagarjuna Konda Andhra Pradesh. B. Nath, 10th November 1963.

(2) SRS/ZSI unregistered one example, 126.0 mm in SL; Mayanur Canal, River Cauvery, Kulithalai, Tamil Nadu. K.C. Jayaram, 7th February 1974.

(3) SRS/ZSI unregistered one example, 168.0 mm in SL; River Krishna at Babaladi, 20 km from Jamkhandi, Bijapur District, Karnataka. K.C. Jayaram and party, 9th May 1988.

(4) SRS/ZSI unregistered two examples, 203.0-213.0 mm in SL; River Krishna at Krishna agraharam, Gadwal, Andhra Pradesh. K.C. Jayaram and party, 25th May 1988.

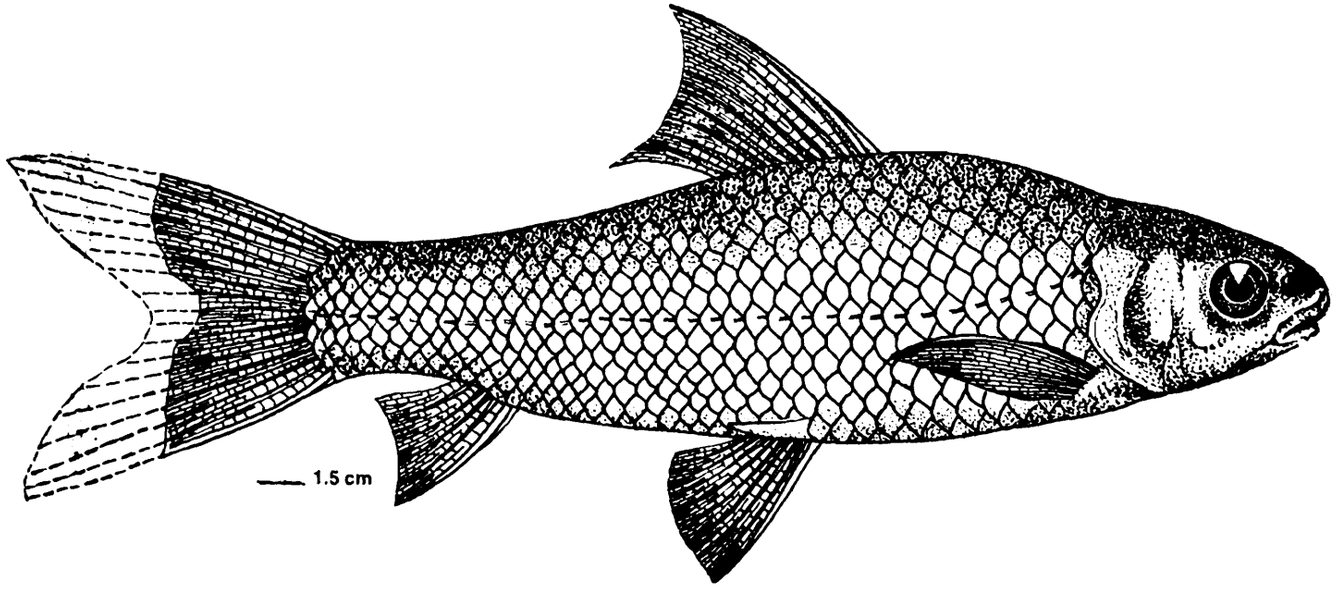

Fig. 22. *Labeo ariza* (Hamilton)

Diagnosis : A *Labeo* with 11 (ii, 9) rays in the dorsal fin. 38-39 scales on lateral line; $5^1/_2$-$6^1/_2$ scales between lateral line and pelvic fin. Dorsal fin inserted slightly posterior to the tip of pectoral fin.

Description : D. ii. 9; P. i, 14; V. i, 8;
A. ii. 5; C. 10+9; Ll. 38-39.

Dorsal profile gently arched, body depth 27.7 (27.0-29.4), head length 25.6 (23.3-27.0) in percent of standard length. Head moderate, width 58.8 (52.6-66.7), height at occiput 71.4 (66.7-76.9), snout length 33.7 (23.8-43.5), width of gape of mouth 25.6 (20.4-34.5), dorsal fin base 66.7 (62.5-71.4), eye diameter 23.8 (18.2-27.8) in percent of head length. Eye 71.4 (62.5-90.9) in percent of snout length, 62.5 (47.6-76.9) in percent of interorbital width. Snout moderately projecting beyond mouth, devoid of lateral lobe, with few tubercles. Labial fold continuous at the angle of mouth, lower lip alone slightly fimbriated and its inner surface covered with cartilaginous covering. One pair of rudimentary maxillary barbels.

Dorsal fin inserted slightly posterior to tip of pectoral fin, nearer to tip of the snout than base of caudal fin. Pectoral fin inserted laterally, not reaching base of pelvic. Pelvic fin not reaching anal fin. Anal fin when laid flat not reaching the base of caudal. Caudal fin deeply forked. Least depth of caudal peduncle 71.4 (58.8-83.3) in percent of its length.

Distribution : INDIA : Peninsular India and up to Orissa.

Scales :

Lateral line scales	: 38-39
Predorsal scales	: 12-13
Prepelvic scales	: 8-10
Preanal scales	: 23-24
Dorsal fin/Ll.	: $7^1/_2$
Pelvic fin/Ll.	: $5^1/_2$-$6^1/_2$
Anal fin/Ll.	: $5^1/_2$-$6^1/_2$
Circumpeduncular scales	: 18-19

Gill rakers : 4-8/26-28

Size : Maximum : 20.5 cm (TL)

Colour : When alive, leaden grey on the dorsal side, becoming silvery towards belly. When preserved in formalin, dark grey on flank and belly brownish. Fins slaty.

Relationship : *L. ariza* has close relationship with another Peninsular form *L. kawrus* (Sykes), differing in the following characters : *L. ariza* is deep bodied while *L. kawrus* is a narrow bodied fish. In *L. kawrus*, the dorsal fin is inserted midway between the end of snout and base of caudal fin, while in *L. ariza* dorsal fin arises nearer the snout than the base of caudal fin. SL/Body depth in *L. ariza* 27.0-29.4 (vs 23.3-25.0 in *L. kawrus*). Snout/Eye 62.5-90.9 (vs 66.7-90.9). LH/Head width 52.6-66.7 (vs 50.0-55.6). LH/Width of mouth 20.4-34.5 (vs 27.0-32.2). LH/HCPD 43.5-55.6 (vs 38.5-45.5). When alive *L. ariza* shows leaden grey superiorly, slivery on the flank and belly. In *L. kawrus*, dorsal silvery with slaty blend. Sometimes a dark

blotch on the scale near the commencement of pateral line, which is lacking in *L. ariza.*

Remarks : Misra (1949) after studying morphometric and meristic characers of *L. ariza* and *L. kawrus* from their type-localities merged *L. kawrus* with *L. ariza.* However, later authors have kept both species as distinct ones. Present study also confirms their individual status.

ADDITIONAL DATA

Table : Non-meristic Characters

Labeo ariza (Hamilton)

	Ratio	Mean	SD	Percentage	Mean	n
	Range			Range		
SL/Body depth	3.4 3.7	3.6	0.11	27.0 - 29.4	27.7	8
SL/LH	3.7 - 4.3	3.9	0.23	23.3 - 27.0	25.6	8
SL/Predorsal length	2.0 - 2.2	2.1	0.27	45.5 - 50.0	47.6	8
SL/Preanal length	1.2 - 1.4	1.3	0.02	71.4 - 83.3	76.9	8
SL/Prepelvic length	1.9 - 2.1	2.0	0.05	47.6 - 52.3	50.0	8
Snout/Eye	1.1 - 1.6	1.4	0.19	62.5 - 90.9	71.4	8
Iow/Eye	1.3 2.1	1.6	0.33	47.6 - 76.9	62.5	8
LH/Eye	3.6 - 5.5	4.2	0.70	18.2 - 27.8	23.8	8
LH/Snout	2.3 - 4.2	3.4	0.52	23.8 - 43.5	33.7	8
LH/Head width	1.5 - 1.9	1.7	0.12	52.6 - 66.7	58.8	8
LH/HT. at occpt.	1.3 - 1.5	1.4	0.08	66.7 - 76.9	71.4	8
LH/Width of mouth	2.9 4.9	3.9	0.64	20.4 - 34.5	25.6	8
LH/LCPD	1.4 2.0	1.6	0.20	50.0 - 71.4	62.5	8
LH/HCPD	1.8 - 2.3	2.1	0.19	43.5 - 55.6	47.6	8
LH/Dorsal fin base	1.4 - 1.6	1.5	0.07	62.5 - 71.4	66.7	8
LCPD/HCPD	1.2 - 1.7	1.4	0.19	58.8 - 83.3	71.4	8

Labeo bata (Hamilton)

(Fig. 23)

Cyprinus bata, Hamilton, *Fish. Ganges,* : 263, 386 1822 (type-locality : rivers and ponds of Bengal). Gunther, *Proc. zool. Soc. Lond;* : 765, 1871 (from Hamilton's Ms drawings).

Crossocheilus bata, Day, *Proc. zool. Soc. Lond;* : 371, 1869 (Orissa, 2 ft length).

Cirrhina bata, Beavan, *HBk. Fw. Fish. India,* : 68, 1877 (Bengal).

Labeo bata, Day, *Fish. India,* : 542, pl.129, fig.5, 1877 (from Krishna and Godavari through Orissa, Lower Bengal and Assam). Day, *Fauna Brit. Ind. Fish;* **1**: 268, 1889 (from Krishna and Godavari river through Orissa, Lower Bengal and Assam). Jenkins, *Rec. Indian Mus;* **3**: 288, 1909 (River Barakar, Giridih subdivision, Hazaribagh District, West Bengal). Shaw and Shebbeare, *J. Asiat. Soc. Beng;* **3**: 50, text-fig.46, 1937 (River Apalchand, west of Duars). Misra, *Rec. Indian Mus;* **40**: 261, 1938 (fish market, Kodur, Cuddapah District, Andhra Pradesh). Mahmood and Rahimullah, *J. Bombay nat. Hist. Soc;* **47**: 109, 1945 (name only, Telugu and common names, Hyderabad State). Job, David and Motwani, *J. Asiat. Soc. Beng;* **18(2)**: 168, 1952 (Konar and Damodar rivers). Hora, *Thapar Commemoration Vol;* : 120, pl.1, 1953 (name only). Job, David and Das, *Indian J. Fish;* **2(1)**: 33, 1955 (Hirakud dam, Mahanadi, Orissa). Sehgal, *J. Bombay nat. Hist. soc;* **53(1)**: 720, 1955 (name only, Tangla, Tezpur fish market and Lokra, Assam). Kalawar and Kelkar, *J. Bombay nat. Hist. Soc;* **53(1)**: 673, 1955 (scientific and Marathi names, Kolhapur, Maharashtra). Alikunhi, *Fish. Cult. India,* : 33, 1957 (feeding habit, growth and breeding). Motwani and David, *J. zool. Soc. India,* **9(1)**: 11, 1958 (name only, River Sone, Uttar Pradesh). Misra, *Rec. zool. Surv. India,* **57(1-4)**: 159, 1959 (synonymy, brief description and distribution). Dewitt, *Stanford Ichth. Bull;* **7(4)**: 75, 84, 1960 (Nepal; introduced). Hora and Pillay, *Fish. Biol. Tech. Pap. Rome,* **(14)**: 31, 49, 61, 1962 (name only). Karamchandani, *Trop. Ecol;* **3(1&2)**: 18, 1962 (Ganga at Dighwara, Bihar). Motwani, Jayaram and Sehgal, *Trop. Ecol;* **3(1&2)**: 20, 1962 (River Brahmaputra and Kosi drainage). David, *Proc. nat. Acad. Sci. India,* **33(2)**: 278, 1963 (Godavari). Tilak, *Rec. zool. Surv. India,* **65(1-4)**: 195, 1967 (Choe-nullah, Tawi river, nearly 15 km west of Jammu city). Dhawan, *J. Bombay nat. Hist. Soc;* **66(1)**: 192, 1969 (name only, with local name, Udaipur Lake). Datta and Majumdar, *Rec. zool. surv. India,* **62(1&2)**: 81, 1970 (some lakes in Rajasthan). Sen, Dasgupta and Rama Rao, *Seafd. Expt. J;* **2(1)**: 3, 1970 (Bengali and English names, Calcutta). Menon, Rama Rao and Sen, *Sci. Cult;* **38**: 342, 1972 (name only, list of fish from the river Hooghly, West Bengal). Venkateswarlu and Rama Rao, *Seafd. Expt. J;* **5(6)**: 3, 1973 (Hindi and Bengali names of Gangetic fishes). Mathur and Yazdani, *Sci. Cult;* **39**: 88, 1973 (name only, Jodhpur District, Rajasthan). Ataur Rahman, *Bangladesh J. Sci. Ind. Res;* **9(3&4)**: 200, 1974 (name only, checklist of fishes of Bangladesh, Bengali names). Menon. *Inl. Fish. Soc. India Spl. Publ;* **(1)**: 30, 1974 (checklist of fishes of Himalayan and Indo-Gangetic Plain). Ataur Rahman, *Bull. Fw. Fish. Res. Sta;* **(1)**: 7, 1975 (name only, checklist of Bangladesh fishes, Bengali names). Venkateswarlu, *Acta Ichthyol. Piscat;* **6(1)**: 87, 1976 (name only, Patna District, Bihar). Jayaram and Majumdar, *Rec. zool. Surv. India,* **69**: 312, 1976 (Mahanadi, Orissa above and below the Hirakud dam). Yazdani, *Newsl. zool. Surv. India,* **2(2)**: 54, 1976 (Kaziranga Wild life sanctuary, Assam). Jayaram and Singh, *Rec. zool. Surv. India,* **72(1-4)** [1974]: 255, 1977 (River Tista, Kumarganj, Jalpaiguri District, North Bengal). Murthy, *Proc. Indian Acad Sci;* **85B(3)**: 134, pl.4, fig.1, 1977 (Lake Kolleru, description). Venkateswarlu, *Acta Ichthyol. Piscat;* **7**: 47, 1977 (name only, Poonpun river, Bihar). Sen, *Seafd. Expt. J;* **10(1)**: 3, 1978 (name only, Assam; scientific, local and English names). Venkateswarlu and Menon, *Acta Ichthyol. Piscat;* **9(7)**: 51, 1979 (checklist of fishes of Ganges). Johal and Tandon, *Pb. Fish. Bull;* **3(2)**: 10, 1979 (synonymy, brief description, East Punjab). Khan and Kamal, *J. Bombay nat. Hist. Soc;* **76(3)**: 532, 1979 (name only, Kosi river, Bihar). Mirza, *Proc. Ist Pakistan Congr. Zool;* : 12, 1980 (name only, distribution in Pakistan and elsewhere, original names and Day's equvalent given). Srivastava, *Fish. U.P. Bihar,* : 45, fig.50, 1980 (description, Ganga river). Jayaram, *HBk. Fw. Fish. India,* : 119, 1981 (key to species).

Jayaram *et al; Rec. zool. Surv. India Occ. Pap;* (**36**): 68, 1982 (Cauvery river). Lone, *Inland Fish. Aquacult;* p.43, 1983 (name only, distribution in Pakistan and elsewhere). Qureshi and Qureshi, *Indian Fish;* : 58, fig.38, 1983 (local names and description). Lipton, *Matsya*, (**9&10**): 113, 1983-84 (name only, with local name, Gumti river, Manu river and Fenny river, Tripura). Venkateswarlu, *Rec. zool. Surv. India Occ. Pap;* (**56**): 33, 1984 (name only, vernacular names). Sen, *Rec. zool. Surv. India Occ. Pap;* (**65**): 69, fig.31, 1985 (diagnostic characters, Assam). Venkateswarlu and Rama Rao, *Rec. zool. Surv. India Occ. Pap;* (**87**): 11, 1986 (correct names for Day's fishes). Sharma and Rajput, *J. Bombay nat. Hist. Soc;* **83(3)** [1986]: 565, 1987 (name only, Bijnor District, Uttar Pradesh). Barman, *Rec. zool. Surv. India,* (**119**): 33, fig.21, 1988 (Amarpur, South Tripura). Rao and Durve, *Indian J. Fish;* **36(1)**: 48, 1989 (name only, Lake Jaisamand, Rajasthan). Talwar and Jhingran, *Inland Fish;* **1**: 193, Text-fig.72, 1991 (description, diagnostic characters and geographical distribution).

Vernacular Names : *Bhangan, Bango, Naro* : ASSAME; *Bhanga, Bhanganbata, Dommarcibatta* : BENGALI; *Chirri* : GUJRATI; *Bata, Gootellah* : HINDI; *Royandi, Tambti* : MARATHI; *Dunguda porah, Rajbata, Rajpodah* : ORIYA; *Bata, Bhangan* : PUNJABI; *Mosu* : TELUGU

Specimens studied : Total 16 examples, 69.0-217.5 mm SL.

(1) ZSI F 712 two examples, 153.0-168.0 mm in SL; Fish market at Calcutta.

(2) ZSI F 2027 one example, 85.0 mm in SL; Pulta Water Works, Barrackpur, Calcutta. Pulta Survey party.

(3) ZSI F 2494 two examples, 86.0-89.0 mm in SL; Gandak river, Bihar. Jenkins, 26th January 1909.

(4) ZSI F 12883 one example, 149.0 mm in SL; Fish market at Kodur Cuddapah District, Andhra Pradesh, 9th August 1929.

(5) ZSI F 2257 one example, 87.0 mm in SL; Rihand dam site, Uttar Pradesh. Rihand Dam survey party, 12th December 1947.

(6) ZSI F 2906 one example, 143.0 mm in SL; Fatesagar Lake, Udaipur District, Rajasthan. R.N. Bhargava, 11th March 1961.

(7) ZSI unregistered one example 93.0 mm in SL; Government Fish Nursery below Garga dam, 15 km north-west of Chas, Bokaro steel city, Dhanbad District, Bihar. Raj Tilak, 10th November 1968.

(8) ZSI F 1378 one example, 129.0 mm in SL; River Cauvery at Thiruvayaru, Tanjore District, Tamil Nadu. K.C. Jayaram, 27th March 1973.

(9) ZSI F 833 one example, 69.0 mm in SL; Wallipur, 11 km north-west of Gania Inspection Bungalow, Puri District, Orissa. Biswas and party, 9th February 1974.

(10) ZSI F 1389 two examples, 109.0-131.5 mm in SL; River Cauvery at Grand Anaicut, Tiruchy District, Tamil Nadu. K.C. Jayaram, 1st February 1977.

(11) ZSI/SRS unregistered three examples, 100.0-217.5 mm in SL; Bhavani river, Tamil Nadu. A.G.K. Menon, 2nd May 1977.

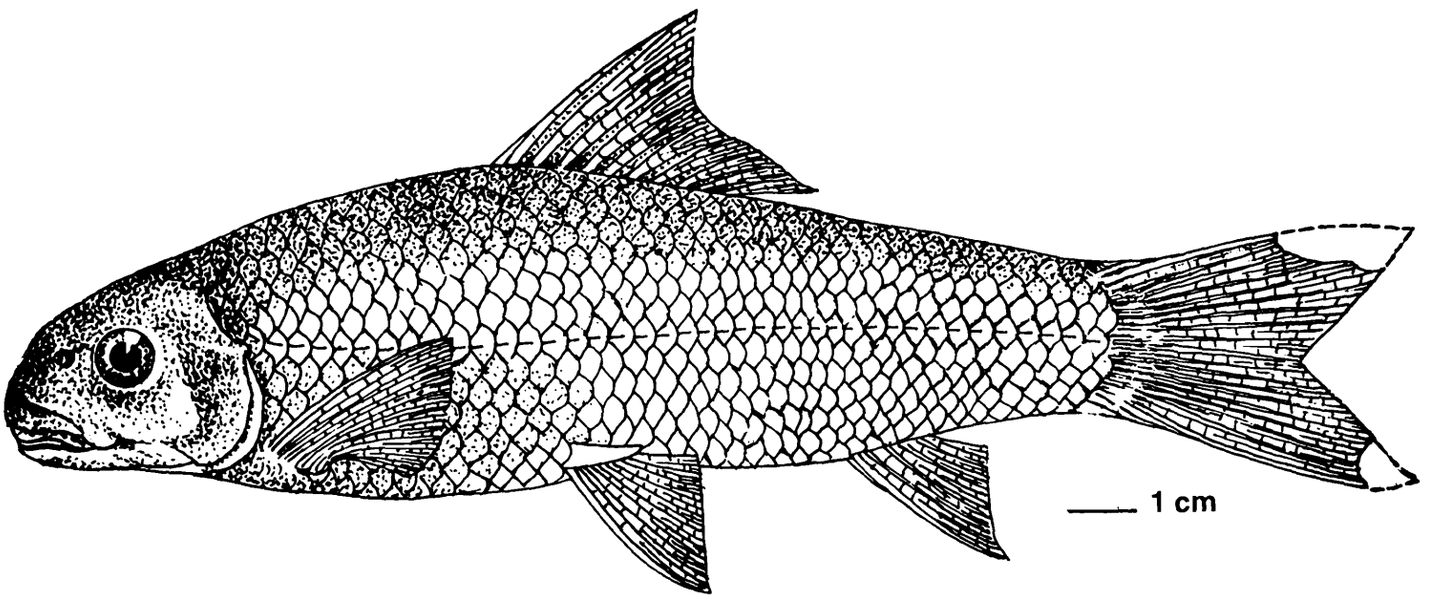

Fig. 23. *Labeo bata* (Hamilton)

Diagnosis : A *Labeo* with 9-10 branched dorsal fin rays; 37-40 lateral line sales. Tubercles inside lower jaw above symphysis. Horny covering inside the lower jaw. Lips very thin. Black blotch on the 5th or 6th scales on the shoulder.

Description : D. ii, 9-10; P. i, 15-16; V. i. 8;
A. ii, 5; C. 10+9; Ll. 37-40.

Dorsal profile gently arched, body depth 26.3 (22.2-30.3), head length 24.4 (19.6-30.3) in percent of standard length. Head moderate, width 58.8 (52.6-66.7), height at occiput 66.7 (47.6-76.9), snout length 31.2 (27.8-40.0), width of gape of mouth 27.8 (22.7-35.7), dorsal fin base 71.4 (66.7-83.3), eye diameter 23.8 (17.2-38.5) in percent of head length. Eye 76.9 (55.6-100.0) in percent of snout length, 62.5 (47.6-90.9) in percent of interorbital width. Snout often covered with tubercles. Lips thin, continuous, lower one very prominent and with a shallow groove along its hind edge. Tubercles often found inside lower jaw above the symphysis. Cartilaginous covering inside the lower jaw. One pair of rudimentary maxillary barbels.

Dorsal fin inserted slightly nearer to tip of snout than base of caudal fin. Fin rays not elongated, outer margin concave. Pectoral fin inserted laterally, reaches the pelvic, which is

shorter. Pelvic fin does not reach anal fin. Anal fin when laid flat not reaching caudal fin base. Caudal fin deeply forked. Least depth of caudal peduncle 71.4 (58.8-90.9) in percent of its height.

Distribution : INDIA : Throughout except Kerala. PAKISTAN, BANGLADESH and NEPAL.

Scales :

Lateral line scales	: 37-40
Predorsal scales	: 12-15
Prepelvic scales	: 10-11
Preanal scales	: 22-25
Dorsal fin/Ll.	: 7-8$^1/_2$
Pelvic fin/Ll.	: 6-6$^1/_2$
Anal fin/Ll.	: 6-7
Circumpeduncular scales	: 19-21

Gill rakers : 6-9/23-26

Size : Maximum : 30.0 cm (TL)

Colour : Silvery, darkest along the back with paired fins stained orange; fine black dots on all the fins; in half grown fishes, there are three or four black spots on the 5th - 6th scales of lateral line; at times adult specimens also have these.

Relationship : This fish is closely related to *L. dero* (Hamilton) differing as below :

Characters	*L. bata*	*L. dero*
Dorsal fin rays	ii, 9-10	ii or iii, 9-10
Lateral line scales	37-40	41-43
Scales between		
Dorsal fin/Ll.	7-8$^1/_2$	8$^1/_2$-9$^1/_2$
Pelvic fin/Ll.	6-6$^1/_2$	6$^1/_2$-7$^1/_2$
Anal fin/Ll.	6-7	6$^1/_2$-7$^1/_2$
Sl/Preanal length	66.7-83.3	65.4-78.7
Snout/Eye	55.6-100	38.9-90.9
LH/Snout	27.8-40.0	27.8-48.8
LH/Head width	52.6-66.7	40.9-64.9
LH/HT. at occpt.	47.6-76.9	61.3-80.0
LH/LCPD	43.5-76.9	45.5-74.4

Remarks : Murthy (1977) while describing some specimens of *L. bata* from Lake Kolleru, Andhra Pradesh, stated that his specimens had 13-14 dorsal fin rays but present study reveals only 11-12 dorsal fin rays. Further, the colour of the fish is stated as "two scales on lateral line

(between 4th and 6th scales) covered with densely packed pigment dots, except along their posteror margins. One or two scales both above and below may also be similarly pigmented, so that this area appears as an irregular blotch" Our study also confirms his observation. But Shaw and Shebbeare (1937), while explaining the colour of the fish caught from Northern Bengal, described it as silvery, darker along the back with lower fins stained orange. Misra (1959) also quoted the same colouration.

ADDITIONAL DATA

Table : Non-meristic Characters

Labeo bata (Hamilton)

	Ratio	Mean	SD	Percentage	Mean	n
	Range			Range		
SL/Body depth	3.3 - 4.5	3.8	0.39	22.2 - 30.3	26.3	16
SL/LH	3.3 - 5.1	4.1	0.41	19.6 - 30.3	24.4	16
SL/Predorsal length	2.0 - 2.4	2.2	0.09	41.7 - 50.0	45.5	16
SL/Preanal length	1.2 - 1.5	1.3	0.05	66.7 - 83.3	76.9	16
SL/Prepelvic length	1.7 - 2.2	2.0	0.09	45.5 - 58.8	50.0	16
Snout/Eye	1.0 - 1.8	1.3	0.22	55.6 - 100.0	76.9	16
Iow/Eye	1.1 - 2.1	1.6	0.27	47.6 - 90.9	62.5	16
LH/Eye	2.6.- 5.8	4.2	0.78	17.2 38.5	23.8	16
LH/Snout	2.5 - 3.6	3.2	0.28	27.8 - 40.0	31.2	16
LH/Head width	1.5 - 1.9	1.7	0.10	52.6 - 66.7	58.8	16
LH/HT. at occpt.	1.3 - 2.1	1.6	0.14	47.6 - 76.9	66.7	16
LH/Width of mouth	2.8 - 4.4	3.6	0.45	22.7 - 35.7	27.8	16
LH/LCPD	1.3 - 2.3	1.6	0.25	43.5 - 76.9	62.5	16
LH/HCPD	1.8 - 2.5	2.2	0.22	40.0 - 55.6	45.5	16
LH/Dorsal fin base	1.2 - 1.5	1.4	0.13	66.7 - 83.3	71.4	16
LCPD/HCPD	1.1 - 1.7	1.4	0.14	58.8 - 90.9	71.4	16

Labeo macmahoni Zugmayer

Labeo macmahoni Zugmayer, 1912, *Ann. Mag. nat. Hist.*, (8) **10**: 597 (type-locality : Dasht river nr. Suntsar and Turbat, Baluchistan, Pakistan).

Vernacular Name : Nil.

Specimen studied : Nil.

Diagnosis : A *Labeo* with an unique combination of four barbels and 11 dorsal fin rays.

Description : D ii 8; A ii 5; P i 16; V i 9

Body elongate and cylindrical. Snout overhanging mouth, with lateral lobes. Eyes large, not visible from underside of head, the diameter about four times in head. Mouth very soft and flabby, with pronounced lateral folds; jaws closely enveloped by lips, lower lip with a median transverse fold and two external folds. Barbels two pairs; rostral barbels shorter than eye, maxillary barbels very small in the corners of mouth. Dorsal fin inserted considerably anterior to pelvic fins, about midway between snout tip and end of anal fin base. Scales moderate; lateral line with 35 or 36 scales; lateral transverse scale rows $4^1/_2$ between lateral line and pelvic fin base.

Colour : In life, slate-blue, golden and silvery on flanks and abdomen; no distinctive marks. Fins pale.

Distribution : PAKISTAN; endemic to Dasht drainage in Baluchistan.

Remarks : None of the Asiatic species combines the lower number of dorsal fin rays with the presence of two pairs of barbels.

Relationship : A unique species related to *L. nigripinnis* Day.

Labeo nigripinnis Day

(Fig. 24)

Labeo nigripinnis Day, *Fish. India,* : 535, 544, pl.132, fig.3, 1878 (type-locality : Sind hills and at their bases). Day, *Fauna. Birt. Ind. Fish;* **1**: 1889 (Sind hills). Fowler, *Proc. Acad. nat. Sci. Philad;* **76**: 97, 1924 (Sutlej river near Bilaspur, a tributary of Ganges river at Dehradun, Giri river, a tributary of Jamuna river). Mathur, *Rec. Indian Mus;* **50(1)**: 107, 1952 (Wadawal, Rajasthan). Mirza, *Proc. Ist Pakistan Congr. Zool;* p.13, 1980 (NWFP, Punjab and Sind, Pakistan). Jayaram, *HBk. Fw. Fish. India,* : 118, 1981 (key to species). Talwar and Jhingran, *Inland Fish;* **1**: 215, 1991 (distribution as Sind hills and rivers at their bases in Pakistan).

Vernacular Names : Nil.

Specimen studied : Total one example (Holotype), 151.0 mm in SL.

(1) ZSI F 1531 one example, 151.0 mm in SL; Sind, Pakistan. F. Day.

Diagnosis : A *Labeo* with 9 branched rays; 40-42 lateral line scales. $7^1/_2$-8 scales between lateral line and dorsal fin; between pelvic fin and lateral line 5-$5^1/_2$.

Description : D. ii, 9; P. i, 16; V. i, 8;
A. ii, 5; C. 10+9; Ll. 40-42.

Dorsal profile somewhat elevated, abdomen straight, body depth 26.4 head length 26.4 in percent of standard length. head moderate, width 55.2, height at occiput 76.3, snout length 32.5, width of gape of mouth 27.5, dorsal fin base 67.6, eye diameter 22.5 in percent of head length. Eye 69.4 in percent of snout length, 56.2 in percent of interorbital width. A pair of minute maxillary barbels. Snout projecting over the mouth wihch is inferior. Lips continuous at the angle of mouth; lower lip thin and reflected off from mandible, which has cartilaginous covering. Large pores on snout; in some specimens a groove across the snout.

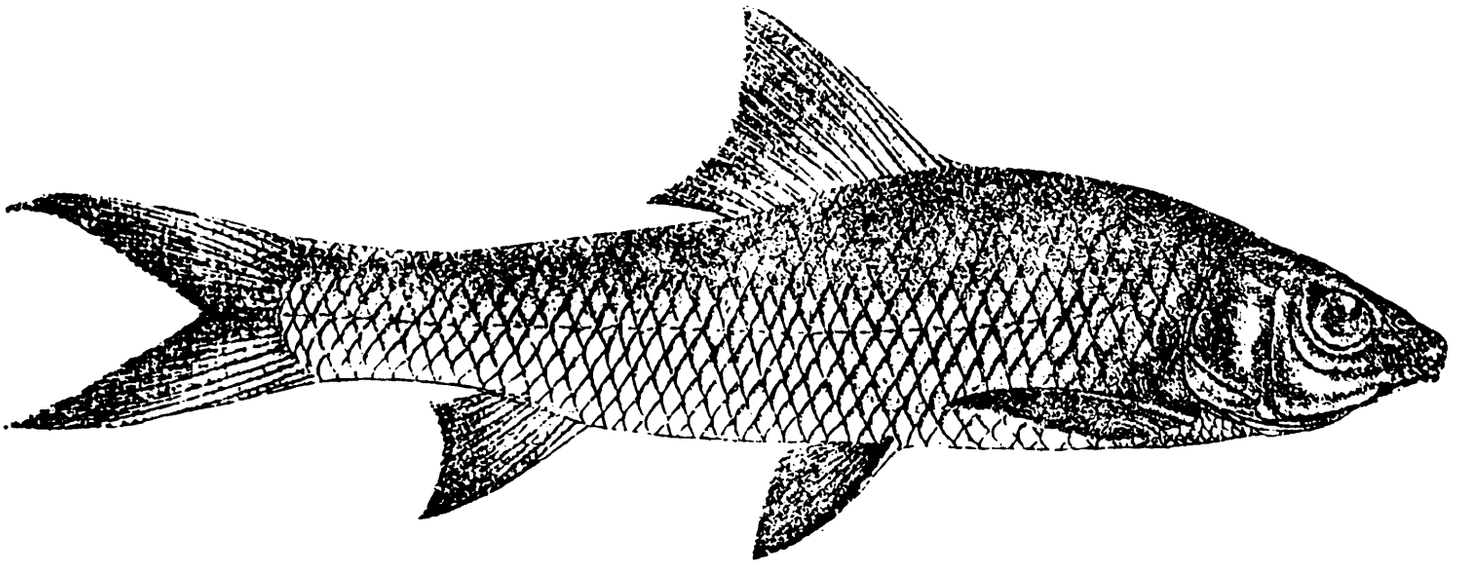

Fig. 24. *Labeo nigripinnis* Day

Dorsal fin inserted midway between the end of snout and the base of caudal fin. Pectoral fin not reaching pelvic fin. Pelvic fin inserted below the first third of dorsal. Caudal fin not reaching the anal fin. Anal fin when laid flat does not reach caudal base. Deeply forked. Least depth of caudal peduncle 78.1 in perent of its length.

Distribution : PAKISTAN : Sind hills and rivers at their bases.

Scales :

Lateral line scales	: 40-42
Predorsal scales	: 15
Prepelvic scales	: 10
Preanal scales	: 26
Dorsal fin/Ll.	: $7^{1}/_{2}$
Pelvic fin/Ll.	: 5
Anal fin/Ll.	: 6
Circumpeduncular scales	: 20

Gill rakers : 7/29

Size : Maximum : 25.0 cm (TL)

Colour : Bluish along the back, becoming dull white on flank and abdomen. In some specimens the bases of scales are dark, a dull band along the side. Fins black in the adult, not always so in the young.

Relationship : Allied to *L. dero* (Hamilton); differing from it in the following characters : in *L. nigripinnis* snout square in appearance; in *L. dero* it is always conical. Lateral line scales 40-42 (vs 41-43 in *L. dero*). Scales between dorsal fin and lateral line $7^1/_2$ (vs $8^1/_2$-$9^1/_2$; between pelvic fin and lateral line 5-$5^1/_2$ (vs $6^1/_2$-$7^1/_2$).

Remarks : Fowler (1924) and Mathur (1952) stated that they recorded this species from Dehradun and Rajasthan respectively, which may be misidentfications.

As descripton is based on only specimen (holotype) preserved in ZSI, Calcutta, and few data taken from Day (1878), the additional data are not presented.

Group - VII
THE *BOGA* GROUP

This group comprises the following species :

(1) *Labeo boga* (Hamilton, 1822, p.286)
(2) *Labeo kawrus* (Sykes, 1841, p.358)

Common characters of these species are as below :

(1) Snout with no lateral lobe
(2) Lips continuous at the angle of the mouth
(3) Cartilaginous covering to the lower lip
(4) Sporadic small tubercles in snout
(5) A pair of small maxillary barbels
(6) Dorsal fin with ii or iii unbranched rays; 8-9 branched rays
(7) Lateral line scales 37-39

Following is a comparative table of the differences between the two species of the group :-

	Dorsal fin	Ll. scales	Predorsal scales	Prepelvic scales	Preanal scales	Dorsal fin/Ll.	Pelvic fin/Ll.	Anal fin/Ll.	Circum-peduncular scales
L. boga (Hamilton)	ii, 8-9	37-39	10-13	10-14	21-25	7-$7^1/_2$	5-$5^1/_2$	$5^1/_2$-6	18-21
L. kawrus (Sykes)	ii or iii, 9	38	11-12	9-11	22-23	$7^1/_2$	$4^1/_2$	$5^1/_2$-6	20-21

Labeo boga (Hamilton)

(Fig. 25)

Cyprinus boga Hamilton, *Fish. Ganges,* : 286, p.28, fig.80, 1822 (type-locality : river Brahmaputra). Valenciennes (in Cuvier and Valenciennes), *Hist. nat. Poiss;* **16**: 432, 1842.

Gobio boga, McClelland, *Asiat. Res;* **19**: 278, 261, 1836 (redescription of Hamilton's Gangetic fishes, 1822). Bleeker, *Verh. Bat. Gen;* **25**: 134, 1853.

Cirrhina boga, Steindachner, *Sitz. Akad. wiss. Wien;* : 64, 1867 (Burma).

Labeo boga, Day, *Fish. India,* : 543, pl.128, fig.3 and pl.129, fig.4, 1877 (Rivers of Gangetic Provinces, Madras and Burma). Beavan, *HBk. Fw. Fish. India,* : 65, 1877 (India generally, and Burma). Day, *Fauna Brit. Ind. Fish;* **1**: 269, 1889 (Rivers of Gangetic Provinces, Madras and Burma). Vinciguerra, *Ann. Mus. civ. Stor. nat. Gen;* **9(2)**: 274, 1889 (Burma). Jenkins, *Rec. Indian Mus;* **3**: 288, 1909 (name only, Giridih tanks, River Barakar, West Bengal). Fowler, *Proc. Acad. nat. Sci. Philad;* **76**: 95, 1924 (Markund river and head waters of Gugger river). Prashad and Mukerji, *Rec. Indian Mus;* **31**: 163, 165, 1929 (Namakawang, Chwang at Kamaing Myitkyina District, Burma). Shaw and Shebbeare, *J. Asiat. Soc. Beng;* **3**: 51, text-fig 47, 1937 (River Jaldhaka, Duars, North Bengal). Hora, *Rec. Indian Mus;* **44(2)**: 196, 1942 (name only, Mysore, hill ranges of Nilgiris, Wynaad and Coorg). Menon, *Rec. Indian Mus;* **47**: 233, 1949 (name only, Chhatra bazar, Nepal). Mathur, *Rec. Indian Mus;* **50(1)**: 107, 1952 (name only, River Banas, Rajasthan). Hora and Mathur, *Bull. nat. Inst. Sci. India,* **(1)**: 32, 1952 (name only, Rajasthan). Job. David and Motwani, *J. Asiat. Soc. Beng;* **18(2)**: 168, 1952 (name only, Damodar river). Job, David and Das, *Indian J. Fish;* **2(1)**: 33, 1955 (rarely recorded from Mahanadi river near Hirakud dam, Orissa). Sehgal, *J. Bombay nat. Hist. Soc;* **53(1)**: 720, 1955 (Tezpur fish market, Lokra, Assam). Motwani and David, *J. zool. Soc. India,* **99(1)**: 11, 1957 (name only, River Sone, Bihar). Misra, *Rec. Indian Mus;* **57(4)**: 160, 1959 (description, distribution, rivers and freshwaters of East Punjab, U.P., Bihar, Darjeeling District, West Bengal. Orissa, Madras. Pakistan and Burma). Dewitt, *Stanford Ichth. Bull;* **7(4)**: 75, 1960 (Biratnagar, Nepal). Karamchandani, *Trop. ecol;* **3(1&2)**: 80, 1962 (name only, Ganga river at Dighwara, Bihar). Menon, *J. zool. Soc. India,* **14**(1): 27, 1962 (name only, Brahmaputra and Kosi drainages). David, *Proc. nat Acad. Sci. India,* **33B(2)**: 278, 1963 (name only, Krishna and Godavari rivers, resembling *L. ariza* and *L. kawrus*). Menon, *Rec. Indian Mus;* **59(4)** [1961]: 378, 1966 (six examples from Ponnaiyar River, Cuddalore, five examples from Bahur, 10 miles North-west of Cuddalore, Tamil Nadu). Datta and Majumdar, *Rec. zool. Surv. India,* **62(1&2)** : 81, pl.9, fig.4, 1970 (Muri Bund, Sawai Madhopur District; Jawai river, Jalor District, Rajasthan). Venkateswarlu and Rama Rao, *Seafd. Expt. J;* **5(6)**: 3, 1973 (Hindi and Bengali names of Gangetic fishes). Sehgal, *J. Bombay nat. Hist. Soc;* **70(3)**: 465, 1973 (Sirmur, Himachal Pradesh). Menon, *Inl. Fish. Soc. India Spl. Publ;* **(1)**: 31, 1974 (checklist of fishes of Himalayan and Indo-Gangetic Plain). Ataur Rahman, *Bangladesh J. Sci. Ind. Res;* **9(3&4)**: 201, 1974 (name only, checklist of Bangladesh fishes, Bengali names). Ataur Rahman, *Bull. Fw. Fish. Res. Sta;* **(1)**: 7, 1975 (name only, checklist of fishes of Bangladesh, Bengali names). Mirza, *Bijdr. Dierk;* **45(2)**: 173, 1975 (distribution in Pakistan as Indus only). Yazdani, *Newsl. zool. Surv. India,* **2(2)**: 54, 1976 (name only, Kaziranga Wild life sanctuary, Assam). Mathur and Mishra, *Newsl. zool. Surv. India,* **2**(2): 157, 1976 (name only, Narbada river, Jabalpur District, Madhya Pradesh). Venkateswarlu, *Acta Ichthyol. Piscat;* **6(1)**: 90, 1976 (name

only, Patna District, Bihar). Datta, *Newsl. zool. surv. India,* **3(1)**: 25, 1977 (name only, Tripura). Choudhury and Sen, *Newsl. zool. Surv. India,* **3(4)**: 220, 1977 (name only, Namchick, Tirap, Arunachal Pradesh). Venkateswarlu, *Acta Ichthyol. Piscat;* **7(1)**: 47, 1977 (name only, River Poonpun, Bihar). Pillai and Yazdani, *Rec. zool. Surv. India,* **72**: 11, 1977 (Someswari river at Baghmara, Garo hills, Meghalaya). Jayaram and Singh, *Rec. zool. Surv. India,* **255**: 1977 (name only, Rivers Purnathara, Atrai Jamuna, North Bengal). Sen, *Seafd. Expt. J;* **10(1)**: 3, 1978 (name only, scientific, local and English names). Khan and Kamal, *J. Bombay nat. Hist. Soc;* **76(3)**: 532, 1979 (name only, Kosi river, Bihar). Venkateswarlu and Menon, *Acta Ichthyol. Piscat;* **9(7)**: 51, 1979 (checklist of fishes of Ganges). Johal and Tandon, *Pb. Fish. Bull;* **3(2)**: 10, 1979 (Machhiwara, Ludhiana, Patiala, Punjab).. Mirza, *Proc. Ist Pakistan Congr. Zool*; : 13, 1980 (name only, original name, Day's equivalent and distribution and key). Srivastava, *Fish. U.P. Bihar,* : 46, fig.31, 1980 (description). Shrestha, *Fish. Nepal,* : 66, 1980 (Chhatra : Kosi river, Chisapani : Karnali river). Jayaram, *HBk. Fw. Fish. India,* : 117, 1981 (key to species). Jayaram *et al; Rec. zool. Surv. India Occ. Pap;* **(36)**: 68, 1982 (Cauvery river, Tamil Nadu). Lone, *Inland Fish. Aquacult. Pakistan,* : 43, 1983 (name only, rare in Punjab). Qureshi and Qureshi, *Indian Fish;* : 59, fig.39, 1983 (description). Venkateswarlu, *Rec. zool. Surv. India Occ. Pap;* **(56)**: 33, 1984 (vernacular names). Sen and Dey, *Rec. zool. Surv. India,* **81(3&4)**: 303, 1984 (name only, Meghalaya). Sen, *Rec. zool. Surv. India Occ. Pap;* **(65)**: 71, 1985 (diagnostic characters, Assam). Venkateswarlu and Rama Rao, *Rec. zool. Surv. India Occ. Pap;* **(87)**: 11, 1986 (scientific name to Day's fishes). Sharma and Rajput, *J. Bombay nat. Hist. Soc;* **83(3)** [1986]: 565, 1987 (common throughout the year in Ramganga, Bijnor District, Uttar Pradesh). Singh, Badola and Dobriyal, *J. Bombay nat. Hist. Soc;* **84(1)**: 127, 1987 (common in Ganga, Nayar Himwal, Kosh, Malan, Rawasan, Song and Suswa rivers, Garhwal, Uttar Pradesh). Mirza and Abubakr, *Biologia,* **34(1)**: 46, 1988 (Chasma Lake, Pakistan). Talwar and Jhingran, *Inland Fish;* **1**: 200, text-fig.73, 1991 (geographical distribution given as Pakistan, India : rivers of Gangetic Provinces, Assam, Orissa. Andhra Pradesh; Bangladesh; Eastern Nepal and Burma).

Vernacular Names : *Bangun bata* : BENGALI; *Bhagan* : HINDI; *Boga, Rahu, Thilke* : NEPALI; *Charkora, Kalabattali* : ORIYA; *Bhangan, Morah* : PUNJABI; *Coal-arinza-candu, Kindameen, Kolarinja kendai* : TAMIL; *Ariza, Mosu* : TELUGU

Specimens studied : Total 57 examples, 56.0-232.0 mm in SL.

(1) SRS/ZSI unregistered one example, 232.0 mm in SL; Bhavani river near Nilgiri, Tamil Nadu. T.S.N. Murthy and party, 31st March 1979.

(2) SRS/ZSI F 988 three examples, 68.0-93.0 mm in SL; River Godavari at Rangampeta, East Godavari District, Andhra Pradesh. T.S.N. Murthy, 17th October 1983.

(3) SRS/ZSI unregistered one example, 105.0 mm in SL; River Pennar near Gangavaram, Cuddapah District, Andhra Pradesh. T. Venkateswarlu, 17th April 1986.

(4) SRS/ZSI F 1796 two examples, 59.0-75.0 mm in SL; River Pennar near Somasila, Cuddapah District, Andhra Pradesh. T. Venkateswarlu, 26th April 1986.

(5) SRS/ZSI F 1343 three examples, 66.0-74.0 mm in SL; River Pennar near Somasila, Cuddapah District, Andhra Pradesh. T. Venkateswarlu, 26th April 1986.

(6) SRS/ZSI unregistered one example, 102.0 mm in SL; River Pennar near Kullur Road, Cuddapah District, Andhra Pradesh. T. Venkateswarlu, 27th April 1986.

(7) SRS/ZSI F 1028 four examples, 56.0-80.0 mm in SL; River Pennar near Somasila, Cuddapah District, Andhra Pradesh. T. Venkateswarlu, 28th April 1986.

(8) SRS/ZSI unregistered eight examples, 104.0-148.0 mm in SL; River Krishna at Regulampally village near Gadwal, Mahbubnagar District, Andhra Pradesh. K.C. Jayaram and party, 17th December 1987.

(9) SRS/ZSI unregistered four examples, 150.0-174.0 mm in SL; River Krishna at Krishna agraharam village, 6 km from Gadwal, Mahbubnagar District, Andhra Pradesh. K.C. Jayaram and party, 17th December 1987.

(10) SRS/ZSI unregistered one example, 182.0 mm in SL; River Krishna at Digraj, 13 km South-west of Sangli Town, Sangli District, Maharashtra. K.C. Jayaram and party, 29th December 1987.

(11) SRS/ZSI unregistered eight examples, 57.0-97.0 mm in SL; River Krishna at Regulampally Gundam near Mahbubnagar District, Andhra Pradesh. K.C. Jayaram and party, 25th May 1988.

(12) SRS/ZSI unregistered 18 examples, 68.0-107.0 mm in SL; River Krishna at Krishna agraharam village, 6 km from Gadwal, Mahbubnagar District, Andhra Pradesh. K.C. Jayaram and party, 29th May 1988.

(13) SRS/ZSI unregistered three examples, 76.0-126.0 mm in SL; River Krishna below Sunnipenta, Kurnool District, Andhra Pradesh. K.C. Jayaram and party, 3rd June 1988.

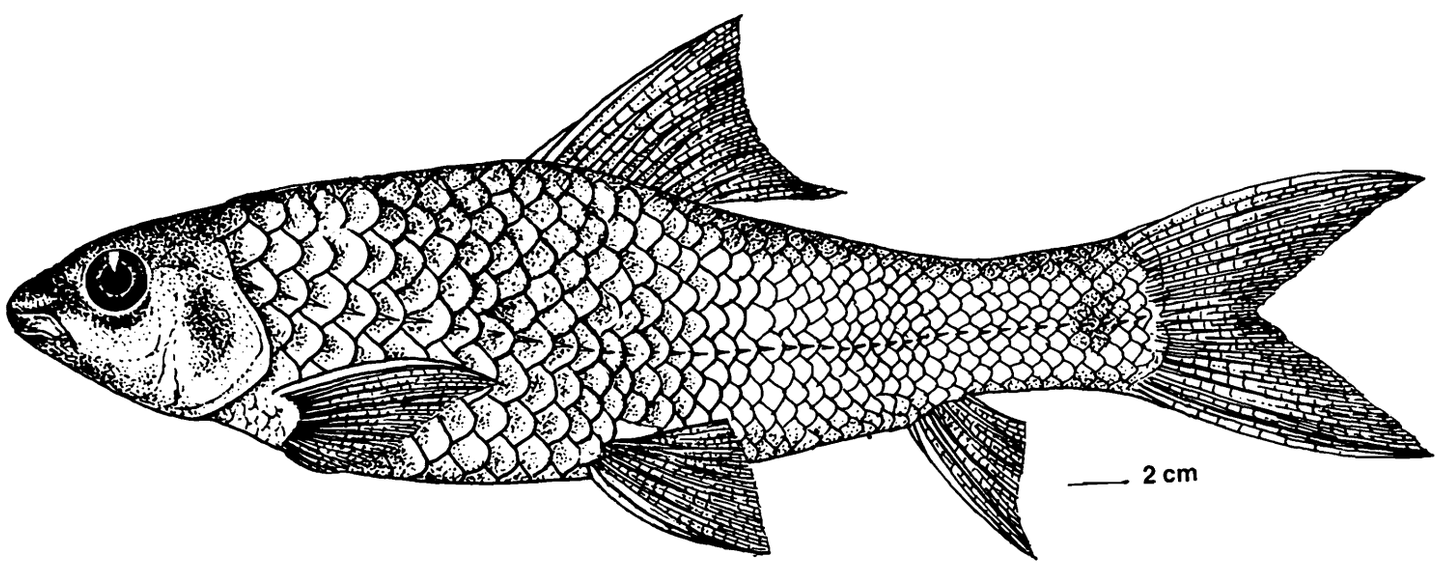

Fig. 25. *Labeo boga* (Hamilton)

Diagnosis : A *Labeo* with 10 or 11 (ii, 8 or 9) dorsal fin rays; 37-39 lateral line scales. Mouth rather narrow and cresentic. Snout moderately projecting beyond jaws, no lateral lobe, occasionally covered with pores. A thin layer of cartilage to inner surface of lower lip.

Description : D. ii, 8-9; P. i, 15-16; V. i. 8;
A. ii, 5; C. 10+9; Ll. 37-39.

Dorsal profile rather convex than abdomen, body depth 25.3 (20.4-29.4), head length 26.4 (20.8-30.3) in percent of standard length. Head small, width 54.9 (43.5-66.7), height at occiput 70.9 (62.5-83.3), snout length 32.1 (25.0-36.0), width of gape of mouth 26.9 (18.9-33.3), dorsal fin base 61.7 (43.5-83.3), eye diameter 25.2 (19.6-31.3) in percent of head length. Eye 69.9 (58.8-100.0) in percent of snout length, 58.8 (43.5-90.9) in percent of interorbital width. Snout moderately projecting beyond the jaws, no lateral lobe. Lips rather thick, the lower one being reflected off from the mandible and externally roughened. A thin layer of cartilage to inner surface of lower lip. Snout occasionally covered with pores. One pair of maxillary barbels.

Dorsal fin inserted nearer tip of snout than base of caudal fin, considerably in advance of the pelvic fins, upper margin concave. Pectoral fin laterally inserted, not reaching pelvic fin. Pelvic fin does not reach anal base. Anal fin when laid flat not reaching caudal fin base. Caudal fin deeply forked. Least depth of caudal peduncle 81.9 (66.7-100.0) in percent of its length.

Scales :

Lateral line scales	: 37-39
Predorsal scales	: 10-13
Prepelvic scales	: 10-14
Preanal scales	: 21-25
Dorsal fin/Ll.	: 7-7$^1/_2$
Pelvic fin/Ll.	: 5-5$^1/_2$
Anal fin/Ll.	: 5$^1/_2$-6
Circumpeduncular scales	: 18-21

Distribution : INDIA : Throughout except Kerala. PAKISTAN, BANGLADESH, NEPAL and MYANMAR.

Gill rakers : 7-8/30-33

Size : Maximum : 30.4 cm (TL)

Colour : While alive, orange on the dorsal, silvery on the flank. fins orange with a reddish tinge. Often a black spot on shoulder. When preserved in formalin, the dorsal becomes slaty, flank pale brown. Fins dusky.

Relationship : *L. boga* has close relationship with *L. kawrus* (Sykes). Close observation of meristic and morphometric characters alone reveals that they are different species. As this fish shows resemblance to *L. kawrus* many have misidentified it with that species. Both have moderately projecting snout, with no lateral lobe, but *L. boga* has, at times, a slight depression on its snout and lips are cresentic; in *L. kawrus* cleft of the mouth commences below the level of the lower edge of the eye. Lips are thick and slightly fimbriated in *L. boga,* while in *L. kawrus*, lower lip alone is slightly fimbriated. Lateral line scales in *L. boga* are 37-39 (vs 38 in *L. kawrus*); pelvic fin/Ll. in *L. boga* is 5-5$^{1}/_{2}$ (vs 4$^{1}/_{2}$ in *L. kawrus*).

Remarks : Misra (1959) stated that *L. boga* has 11-13 dorsal fin rays. But our observation shows dorsal fin with 10 or 11 rays only.

ADDITIONAL DATA

Table : Non-meristic Characters

Labeo boga (Hamilton)

	Ratio	Mean	SD	Percentage	Mean	n
	Range			Range		
SL/Body depth	3.4 - 4.9	4.0	0.38	20.4 - 29.4	25.3	57
SL/LH	3.3 - 4.8	3.8	0.27	20.8 - 30.3	26.4	57
SL/Predorsal length	1.9 - 2.3	2.1	0.09	43.5 - 52.6	47.8	57
SL/Preanal length	1.2 - 1.3	1.25	0.65	76.9 - 83.3	78.7	57
SL/Prepelvic length	1.7 2.3	1.9	0.17	43.5 - 58.8	52.9	57
Snout/Eye	1.0 1.7	1.4	1.43	58.8 - 100.0	69.9	57
Iow/Eye	1.1 2.3	1.7	1.81	43.5 - 90.9	58.8	57
LH/Eye	3.2 5.1	4.1	0.66	19.6 - 31.3	25.2	57
LH/Snout	2.8 4.0	3.1	0.76	25.0 - 36.0	32.1	57
LH/Head width	1.5 2.3	1.8	0.14	43.5 - 66.7	54.9	57
LH/HT. at occpt.	1.2 1.6	1.4	0.09	62.5 - 83.3	70.9	57
LH/Width of mouth	3.0 - 5.3	3.7	0.47	18.9 - 33.3	26.9	57
LH/LCPD	1.3 - 2.3	1.8	0.22	43.5 - 76.9	55.2	57
LH/HCPD	1.9 - 3.0	2.2	0.23	33.3 - 52.6	45.0	57
LH/Dorsal fin base	1.2 2.3	1.6	0.18	43.5 - 83.3	61.7	57
LCPD/HCPD	1.0 - 1.5	1.2	0.21	66.7 - 100.0	81.9	57

Labeo kawrus (Sykes)

(Fig. 26)

Chondrostoma kawrus Sykes, *Trans. zool. Soc. Lond;* **2**: 358, pl.62, fig.2, 1841 (type-locality :- Bhima River, Poona, Maharashtra). Gunther, *Cat. Fish. Brit. Mus;* **7**: 35, 1868 (foot-note).

Labeo kawrus, Day, *Fish. India,* : 545, pl.131, fig.5, 1877 (Poona and Deccan), Day, *Fauna. Brit. Ind. Fish;* **1**: 272, 1889 (Poona and Deccan). Hora, *Rec. Indian Mus;* **44(2)**: 196, 1942 (name only, reported from Mysore State and neighbouring hill ranges of the Nilgiris, Wynaad and Coorg). Misra (in part), *J. zool. Soc. India,* **1**: 14, 1949 (systematic status of *L. ariza* and *L. kawrus* from Peninsular India). David, *Proc. nat. Acad. Sci. India,* **33B(2)**: 278, 1963 (record from River Krishna, earlier record by Day (1889) and David (1957) quoted). Jayaram, *HBk. Fw. Fish. India,* : 118, 1981 (distribution given as Poona). Singh and Kamble, *Bull. zool. Surv. India,* **8(1-3)**: 293, 1987 (name only, Jalgaon District, Maharashtra). Yazdani and Singh, *J. Bombay nat. Hist. Soc;* **87(1)**: 160, 1989 (name only, Ujni Wetland, Maharashtra). Talwar and Jhingran, *Inland Fish;* **1**: 211, 1991 (distribution given as Western States upto Deccan).

Vernacular Names : Nil

Specimens studied : Total four examples. 116.0-145.0 mm in SL.

(1) SRS/ZSI unregistered three examples, 116.0-140.0 mm in SL; River Coleroon at Upper Anaicut, Trichy District, Tamil Nadu. K.C. Jayaram and party, 30th March 1973.

(2) SRS/ZSI unregistered one example, 145.0 mm in Sl; River Krishna at Lingalagattu, 8 km below Sunnipenta, Srisailam downstream below the reservoir, Kurnool, Andhra Pradesh. K.C. Jayaram and party, 3rd June 1988.

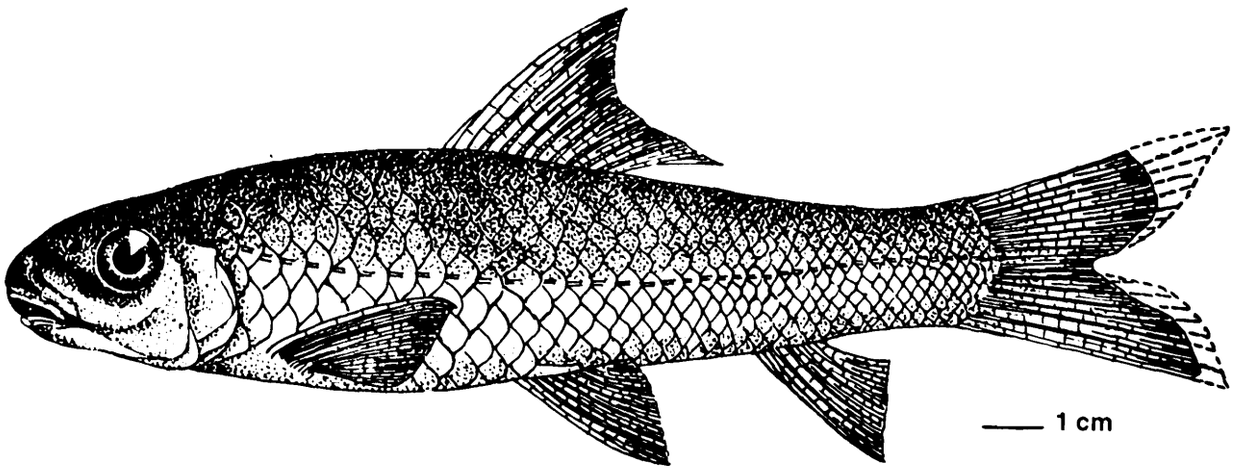

Fig. 26. *Labeo kawrus* (Sykes)

Diagnosis : A *Labeo* with 11 of 12 (ii or iii, 9) dorsal fin rays. 38 lateral line scales. Snout obtuse, not overhanging the jaws. The cleft of mouth commences below the level of the lower edge of eye. Edges of lips smooth. $4^1/_2$ rows of scales between lateral line and pelvic fin.

Description : D. ii of iii, 9; P. i, 15; V. i. 8;
A. ii, 5; C. 10+9; Ll. 38.

Dorsal and abdominal profiles equally convex, body depth 24.2 (23.3-25.0), head length 26.0 (25.0-27.0) in percent of standard length. Head small, width 52.8 (50.0-55.6), height at occiput 66.9 (62.5-71.4), snout length 31.0 (26.3-35.7), width of gape of mouth 29.6 (27.0-32.2), dorsal fin base 66.9 (62.5-71.4), eye diameter 22.6 (19.6-25.6) in percent of head length. Eye 78.8 (66.7-90.9) in percent of snout length, 65.1 (58.8-71.4) in percent of interorbital width. Snout very obtuse and not overhanging the jaws Sporadic small tubercles on the snout. Cleft of mouth commencing below level of edge of eye. Lips continuous at the angle of mouth, lower one very thin and reflected off the mandible which is rounded and has a thin cartilaginous covering; edges of lips smooth. A pair of small maxillary barbels.

Dorsal fin inserted midway between the tip of snout and the base of caudal fin, its upper edge concave. Pectoral fin inserted laterally, not reaching pelvic fin. Pelvic fin does not extend to anal fin. Anal fin when laid flat not reaching caudal fin base. Caudal fin deeply forked. Least depth of caudal peduncle 69.7 (62.5-76.9) in percent of its length. Lateral line rather indistinct in some specimens.

Distribution : INDIA : Peninsular India except Kerala.

Scales :

Lateral line scales	: 38
Predorsal scales	: 11-12
Prepelvic scales	: 9-11
Preanal scales	: 22-23
Dorsal fin/Ll.	: $7^1/_2$
Pelvic fin/Ll.	: $4^1/_2$
Anal fin/Ll.	: $5^1/_2$-6
Circumpedundular scales	: 20-21

Gill rakers : 4-5/24-26

Size : Maximum : 20.0 cm (SL)

Colour : Generally silvery; dorsal brownish becoming silvery towards belly. Dorsal and caudal fin stained with grey. Sometimes a dark blotch on the scales near the commencement of lateral line.

Relationship : As already stated under *L. ariza*. The differentiating features have been discussed elsewhere.

ADDITIONAL DATA

Table : Non-meristic Characters

Labeo kawrus (Sykes)

	Ratio Range	Mean	SD	Percentage Range	Mean	n
SL/Body depth	4.0 4.3	4.1	0.15	23.3 - 25.0	24.2	4
SL/LH	3.7 4.0	3.8	0.11	25.0 - 27.0	26.0	4
SL/Predorsal length	2.1 2.3	2.2	0.03	43.5 - 47.6	45.6	4
SL/Preanal length	1.2 1.4	1.3	0.02	71.4 - 83.3	77.4	4
SL/Prepelvic length	1.8 2.0	1.9	0.06	50.0 - 55.6	52.8	4
Snout/Eye	1.1 1.5	1.3	0.15	66.7 90.9	78.8	4
Iow/Eye	1.4 1.7	1.5	0.11	58.8 - 71.4	65.1	4
LH/Eye	3.9 5.1	4.5	0.48	19.6 - 25.6	22.6	4
LH/Snout	2.8 3.8	3.3	0.44	26.3 - 35.7	31.0	4
LH/Head width	1.8 2.0	1.9	0.08	50.0 - 55.6	52.8	4
LH/HT. at occpt.	1.4 - 1.6	1.5	0.09	62.5 - 71.4	66.9	4
LH/Width of mouth	3.1 3.7	3.4	0.27	27.0 - 32.2	29.6	4
LH/LCPD	1.5 - 1.8	1.7	0.12	55.6 - 66.7	61.2	4
LH/HCPD	2.2 2.6	2.4	0.28	38.5 - 45.5	42.0	4
LH/Dorsal fin base	1.4 1.6	1.5	0.06	62.5 - 71.4	66.9	4
LCPD/HCPD	1.4 1.5	1.45	0.05	62.5 - 76.9	69.0	2

Group - VIII

THE *POTAIL* GROUP

This group comprises the following species :

1. *Labeo potail* (Sykes, 1841, p.354)
2. *Labeo caeruleus* Day, 1878, p.540

Common characters of these species are as below :

1. Both lips continuous at the corner of the mouth

2. Inner cartilaginous covering to both lips
3. One pair of maxillary barbels
4. Dorsal fin with ii or iii unbranched rays; 11-12 branched rays
5. Lateral line scales 39-41
6. Predorsal scales 12-14
7. Circumpeduncular scales 20-23

The following is a comparative table of the differences between the two species of the group :-

	Dorsal fin	Ll. scales	Predorsal scales	Prepelvic scales	Preanal scales	Dorsal fin/Ll.	Pelvic fin/Ll.	Anal fin/Ll.	Circum-peduncular scales
Labeo potail (Sykes)	ii or iii, 11-12	39-41	12-14	9-11	21-25	8-8½	5½-6½	6-7½	20-23
Labeo caeruleus Day	ii, 12	40-41	13-14	16-18	25-26	7-7½	6-6½	5½-6	20-21

Labeo potail (Sykes)

(Fig. 27)

Cyprinus potail Sykes, *Trans. zool. Soc. Lond;* **2**: 354, 1841 (type-locality : Bheema river, Maharashtra). Jerdon, *Madras J. Lit. Sci.;* **15**: 302, 1848 (brief description).

Leuciscus potail, Bleeker, *Verh. Bat. Gen;* **25**: 25, 1853.

Labeo potail, Day, *Trans. Lin. Soc. zool;* : 572, 1876 (Deccan), Day, *Fish. India,* : 539, pl.127, fig.3, 1878 (Deccan, from Poona to Tamboodra river). Day, *Fauna. Brit. Ind. Fish;* **1**: 264, 1889 (Deccan from Poona to Tungabhadra river). Chaudhuri, *Rec. Indian Mus;* **6**: 15, 1911 (name only. resemblance to *L. yunnansis*). Fraser, *J. Bombay nat. Hist. Soc;* **43(1)**: 85, 1942 (name only, caught from near Fitzgerald bridge, Poona, Maharashtra). Hora, *Rec. Indian Mus;* **44(2)**: 196, 1942 (name only, distribution given as Mysore, Deccan and Ceylon). Hora and Misra, *J. Bombay nat. Hist. Soc;* **43(2)**: 221 (Poona, Hindi names, distribution given as Ceylon and Peninsula of India) 225, 1942 (variation in growth and length of rostral barbels, *L. porcellus* synonymised). Mohamood and Rahimullah, *J. Bombay nat. Hist. Soc;* **47**: 109, 1947 (Telugu name, common name given, Hyderabad State). Chacko and Kuriyan, *Proc. Indian Acad. Sci;* **28B(5)**: 168, 1948 (name only, collected from Tungabhadra river, Mysore). David, *Proc. nat. Inst. Sci. India,* **22B(3)**: 166, 1956 (Badra river at Bhadravati in Karnataka, stomach content). David, *Proc. nat. Acad. Sci. India,* **22B(2)**: 278, 1963 (Godavari and Krishna rivers). Johal and Tandon, *Pb. Fish. Bull;* **3(2)**: 12, 1979 (synonymy, brief description, East Punjab; East Punjab doubtful). Jayaram, *HBk. Fw. Fish. India,* : 121, 1981 (key to species). Jayaram *et al; Rec. zool. Surv. India Occ. pap;* **(36)**: 70, 1982 (Cauvery river; Cauvery doubtful). Venkateswarlu and Rama Rao, *Rec. zool. Surv. India Occ. Pap;* **(87)**: 11, 1986 (correct name for Day's fishes). Talwar and Jhingran, *Inland fish;* 1: 218, 1991 (geographical distribution given as Maharashtra, the Deccan and Cauvery river system; Cauvery doubtful).

Vernacular Names : *Tamthee, Lahhoor, Khandwee, Ghobree* : HINDI.

Specimens studied : Total 19 examples, 86.0-246.0 mm in SL.

(1) ZSI F 1127 one example, 181.0 mm in SL; Deccan.

(2) ZSI F 12112 two examples, 193.0-226.0 mm in SL; Moolamutha river one mile east of Fitzgerald bridge, Poona, Maharashtra. A.G.L. Fraser, 20th September, 1936.

(3) ZSI unregistered one example, 86.0 mm in SL; Lake Fife, Poona, Maharashtra. A.G.L. Fraser, 20th December 1936.

(4) SRS/ZSI unregistered one example, 246.0 mm in SL; River Krishna at Bhilwada, 22 km from Sangli, Sangli District, Maharashtra. K.C. Jayaram and party, 28th December 1987.

(5) SRS/ZSI unregistered eight examples, 114.0-155.5 mm in SL; Fish market at Bagalkot, caught from River Krishna, Bijapur District, Karnataka. K.C. Jayaram and party, 4th March 1990.

(6) SRS/ZSI unregistered six examples, 132.0-173.0 mm in SL; Fish market at Sangli Town, Sangli District, Maharashtra. K.C. Jayaram and party, 6th March 1990.

Diagnosis : A *Labeo* with 39-41 lateral line scales. 11-12 dorsal fin rays. Scales between dorsal fin and lateral line 8-8$^{1}/_{2}$. Eye 59.2 (41.6-76.9) in percent of snout length. The dorsal region of lower lip with striations; ventral side with fimbriae.

Description : D. ii or iii 11-12; P. i, 14-15; V. i, 8;
A. ii, 5; C. 10+9; ll. 39-41.

Dorsal profile gently arched, body depth 30.4 (23.8-37.0), head length 26.5 (22.7-30.3) in percent of standard length. head moderate, width 61.9 (52.7-71.4), height at occiput 77.3 (71.4-83.3), snout length 44.2 (38.5-50.0), width of gape of mouth 32.4 (27.8-37.0), dorsal fin base 101.0 (90.9-111.1), eye diameter 24.3 (20.0-28.6) in percent of head length. eye 59.2 (41.6-76.9) in percent of snout length, 56.9 (37.0-76.9) in percent of interorbital width. Two pairs of barbels in young specimens, only one pair of maxillary in rather mature specimens. Snout overhanging, fleshy, truncated, without any depression, with slightly produced lateral lobe. Snout often without pores; if present, fine. Deep groove across the chin. Lips thick, ventral side of lower lip highly papillated, dorsal side striated. Both lips continuous at the corner of the mouth, with inner cartilaginous covering. Postlabial groove continuous.

Dorsal fin inserted mid-way between tip of snout and caudal fin base, its outer margin concave. Pectoral fin inserted laterally immediately behind the opercle and does not reach the pelvic fin which arises below the anterior 4 or 5th rays of the dorsal fin and does not reach the anal fin. Anal fin reaching base of caudal fin. Caudal fin forked. Caudal peduncle 83.3 (66.7-100.0) in percent of its length. lateral line curved below the origin of the dorsal fin.

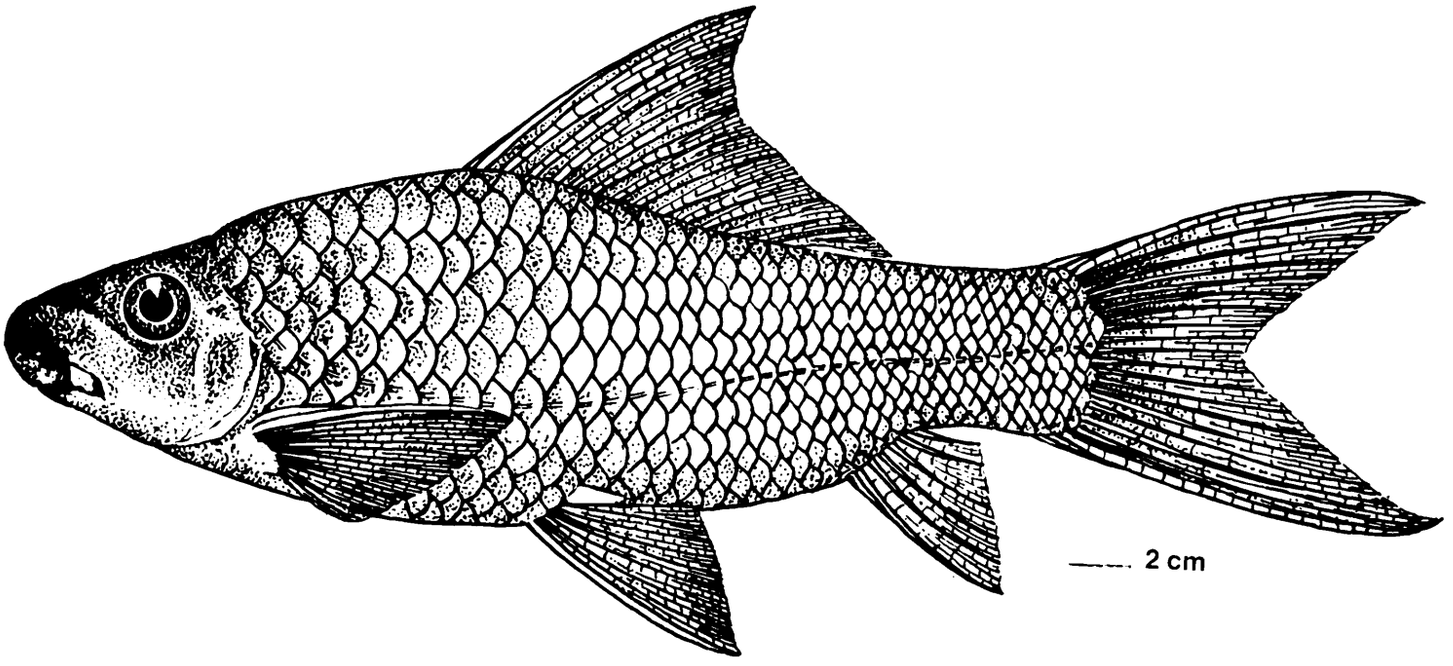

Fig. 27. *Labeo potail* (Sykes)

Distribution : INDIA : Peninsular india, not below the Krishna river system.

Scales :

Lateral line scales	: 39-41
Predorsal scales	: 12-14
Prepelvic scales	: 9-11
Preanal scales	: 21-25
Dorsal fin/Ll.	: 8-8$^{1}/_{2}$
Pelvic fin/Ll.	: 5$^{1}/_{2}$-6$^{1}/_{2}$
Anal fin/Ll.	: 6$^{1}/_{2}$-7$^{1}/_{2}$
Circumpeduncular scales	: 20-23

Gill rakers : 14-15/48-49

Size : Maximum 30.0 cm (TL)

Colour : In life, the upper part oilve green, becoming silvery towards belly. Each scale with red lunule. When preserved in formalin, the dorsal region becomes dark brown; lateral and belly yellowish. Fins dusky.

Relationship : *L. potail* has close resemblance to *Labeo kontius* (Jerdon) of Cauvery river system, though it shares many of the characters of *L. kontius*, they can be differentiated thus: dorsal fin ray in *L. potail* 14 (iii, 11 or ii, 12) vs 14-16 (ii or iii, 12-13 or ii, 14). In *L. potail*

the rostral barbels are found only in the young specimens, not in the mature ones, but in *L. kontius*, rostral barbels are found both in young and adults.

In morphometric measurements also both species differ in certain characteristics.

Characters	*L. potail*	*L. kontius*
SL/Prepelvic length	55.(47.6-55.5)	57.1 (48.1-66.2)
LH/Width of mouth	32.4 (27.8-37.0)	26.7 (20.0-33.3)
LCPD/HCPD	83.3 (66.7-100.0)	57. (46.7-67.6)

Remarks : Hora and Misra (1942) extended the range of distribution of this species from main land India to Sri Lanka. Jayaram (1981) limited its distribution to India only. Present study also confirms that the distribution of this species is confined only to Peninsular India. Pethiyagoda (1991) makes no mention of this species.

ADDITIONAL DATA

Table : Non-meristic Characters

Labeo potail (Sykes)

	Ratio	**Mean**	**SD**	**Percentage**	**Mean**	**n**
	Range			**Range**		
SL/Body depth	2.7 - 4.2	3.1	0.32	23.8 - 37.0	30.4	19
SL/LH	3.3 4.4	3.9	0.25	22.7 - 30.3	26.5	19
SL/Predorsal length	1.9 2.2	2.0	0.07	45.4 - 52.6	49.0	19
SL/Preanal length	1.2 - 1.4	1.3	0.39	71.4 - 83.3	77.3	19
SL/Prepelvic length	1.8 - 2.1	1.9	0.07	47.6 - 55.5	51.5	19
Snout/Eye	1.3 2.4	1.7	0.27	41.6 - 76.9	59.2	19
Iow/Eye	1.3 - 2.7	2.0	0.45	37.0 - 76.9	56.9	19
LH/Eye	3.5 5.0	4.2	0.50	20.0 - 28.6	24.3	19
LH/Snout	2.0 2.6	2.3	0.14	38.5 - 50.0	44.2	19
LH/Head width	1.4 1.9	1.5	0.10	52.7 - 71.4	61.9	19
LH/HT. at occpt.	1.2 1.4	1.3	0.03	71.4 - 83.3	77.3	19
LH/Width of mouth	2.7 3.6	2.0	0.75	27.8 - 37.0	32.4	19
LH/LCPD	1.3 1.8	1.5	0.13	55.5 - 76.9	66.2	19
LH/HCPD	1.5 2.1	1.8	0.17	47.6 - 66.7	57.1	19
LH/Dorsal fin base	0.9 1.1	1.0	0.06	90.9 - 111.1	101.0	19
LCPD/HCPD	1.0 1.5	1.2	0.13	66.7 - 100.0	83.3	19

Labeo caeruleus Day

(Fig. 28)

Labeo caerulus Day, *Fish. India,* : 540, pl.129, fig.3, 1878 (type-locality : Rivers at the base of Sind hills). Day, *Fauna. Brit. Ind. Fish;* **1**: 265, 1889 (Rivers at the base of Sind hills). Zugmayer, *Abh. bayer. Akad. Wiss;* **26(6)**: 25, 1913 (Baluchistan, Pakistan). Mirza, *Biologia*, **18**: 165, 1972 (Eastern part of Baluchistan). Mirza, *Biologia,* **20(1)**: 78, 1974 (name only, distribution in Indus Plain in Pakistan). Mirza, *Bijdr. Dierk*; **45(2)**: 173, 1975 (distribution in Baluchistan, Pakistan only). Siddiqui and Mirza, *Pakistan J. zool;* **10(2)**: 299, 1978 (Dera Ghazkhan and Head Tounsa, Multan Division, Pakistan) Mirza, *Proc. Ist Pakistan Congr. zool;* : 13, 1980 (name only, distribution in Pakistan and elsewhere, original name and Day's equivalent given). Jayaram, *HBk. Fw. Fish. India,* : 121, 1981 (key to species). Lone, *Inland Fish. Aquacult. Pakistan,* : 43, 1983 (distribution in Pakistan). Mirza and Omer, *Biologia,* **30(1)**: 80, 1984 (eastern part of Baluchistan). Venkateswarlu and Rama Rao, *Rec. zool. Surv. India Occ. Pap;* **(87)**: 11, 1986 (correct name for Day's fishes). Talwar and Jhingran, *Inland Fish;* **1**: 202, 1991 (geographical distribution given as Pakistan : endemic to the South western parts at the base of hills between Baluchistan and Sind).

Vernacular Names : Nil

Specimens studied : Total three examples, 22.0-25.0 mm in SL.

(1) ZSI F 4656 three examples, 22.0-25.0 mm in SL; Sind, Pakistan. F. Day.

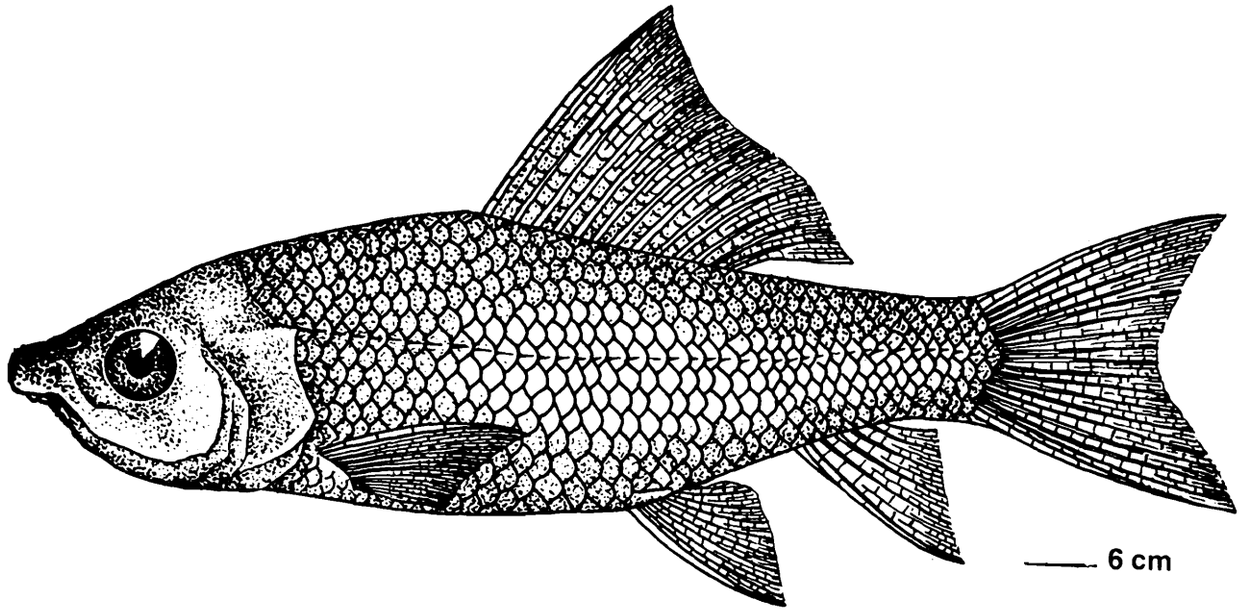

Fig. 28. *Labeo caeruleus* Day

Diagnosis : A *Labeo* with 14 (ii, 12) dorsal fin rays; lateral line scales 40-41; prepelvic scales 16-18. This can be identified from its colour also; bluish with yellowish tinge on the sides and beneath. Outer half of anal fin nearly black; black lunule on the cadal fin.

Description : D. ii, 12; P. i. 16; V. i. 8;
A. ii, 5; C. 10+9; Ll. 40-41.

Body depth 33.1 (31.8-34.0), head length 31.0 (29.1-32.0) in percent of standard length. Head small, width 63.8 (62.5-64.5), height at occiput 82.4 (75.2-93.4), snout length 29.5 (28.6-31.2), width of gape of mouth 29.5 (28.6-31.2), dorsal fin base 75.3 (69.0-85.5), eye diameter 29.5 (28.6-31.2) in percent of head length. Eye 54.2 (50.0-57.1) in percent of snout length, 54.2 (50.0-57.1) in percent of interorbital width. Mouth narrow. Snout overhanging the mouth; no lateral lobe. Lips continuous at the corner of the mouth, having distinct inner fold in their entire circumference. Both lips fringed. a horny covering to either lip. A short pair of maxillary barbels.

Dorsal fin inserted slightly nearer to tip of snout than base of caudal fin. Upper edge of dorsal fin concave. Pectoral fin as long as head and it does not reach the base of pelvic fin, not the latter to the anal fin. Anal fin, when laid flat, reaches the base of caudal fin which is deeply forked. Least depth of caudal peduncle 77.1 (75.-78.1) in percent of its length.

Distribution : PAKISTAN : Rivers at the base of Sind hills and Baluchistan.

Scales :

Lateral line scales	: 40-41
Predorsal scales	: 13-14
Prepelvic scales	: 16-18
Preanal scales	: 25-26
Dorsal fin/Ll.	: 7-7$^{1}/_{2}$
Pelvic fin/Ll.	: 6-6$^{1}/_{2}$
Anal fin/Ll.	: 5$^{1}/_{2}$-6
Circumpeduncular scales	: 20-21

Gill rakers : 7-9/32-33

Size : Maximum : 35.0 cm (SL)

Colour : Bluish with yellowish tinge along the flank and beneath. Outer half of anal fin nearly black, and a black lunule on the caudal.

Relationship : This species has resemblance to *L. dero* (Hamilton). Snout is obtuse in *L. caeruleus*, but in *L. dero* the snout is conical. The lateral line scales in *L. caeruleus* are 40-41 (vs 41-43). Dorsal fin with 14 rays in *L. caeruleus* (vs 11-13).

ADDITIONAL DATA

Table : Non-meristic Characters

Labeo caeruleus (Day)

	Ratio	Mean	SD	Percentage	Mean	n
	Range			Range		
SL/Body depth	2.9 3.1	3.0	0.08	31.8 34.0	33.1	3
SL/LH	3.1 3.4	3.2	0.14	29.1 - 32.0	31.0	3
SL/Predorsal length	1.8 - 2.0	1.9	0.10	50.0 56.2	52.0	3
SL/Preanal length	1.2 1.3	1.25	0.03	77.5 82.0	80.2	3
SL/Prepelvic length	1.7 1.8	1.75	0.08	54.0 - 59.9	57.7	3
Snout/Eye	1.0 2.0	1.8	0.10	50.0 57.1	54.2	3
Iow/Eye	1.7 2.0	1.8	0.10	50.0 57.1	54.2	3
LH/Eye	3.2 - 3.5	3.4	0.14	28.6 31.2	29.5	3
LH/Snout	3.2 - 3.5	3.4	0.14	28.6 31.2	29.5	3
LH/Head width	1.5 - 1.6	1.55	0.02	62.5 - 64.5	63.8	3
LH/HT. at occpt.	1.1 1.3	1.2	0.11	75.2 - 93.4	82.4	3
LH/Width of mouth	3.2 3.5	3.4	0.14	28.6 31.2	29.5	3
LH/LCPD	1.5 - 1.7	1.6	0.09	57.1 - 64.5	62.0	3
LH/HCPD	2.0 2.3	2.2	0.14	42.9 - 50.0	45.6	3
LH/Dorsal fin base	1.1 - 1.4	1.3	0.12	69.0 - 85.5	75.3	3
LCPD/HCPD	1.2 - 1.3	1.25	0.02	75.2 - 78.1	77.1	3

Remarks : Originally this species was described by Day (1878) from Sind provinces. Subsequently, Zugmayer (1913), Mirza (1972), Mirza and Omer (1984) reported it from Baluchistan. Hence, its distribution is extended from Sind hills to Baluchistan, Pakistan. Shrestha (1981)'s record from Nepal is doubtful since Dewitt (1960) didn't report this from there and no specimen has been reported from Nepal so far.

SUMMARY

Zoogeography

Fishes of the genus *Labeo* Cuvier are widely distributed throughout India, Afghanistan, Pakistan, Bangladesh, Myanmar, Thailand up to South China. They are well represented with about 49 species in tropical Africa and Syria. It has a limited distribution in Sri Lanka; 28

TABLE

Name of *Labeo* species	Pakistan	INDIA									Sri Lanka	Bangladesh	Nepal	Myanmar	Thailand
		Ganges	Yamuna	Brahmaputra	Mahanadi	Godavari	Krishna	Cauvery	Western Ghats						
									Eastern face	Western face					
Labeo angra (Hamilton)		xxx	xxx	xxx	xxx							xxx	xxx	xxx	
Labeo ariza (Hamilton)							xxx	xxx	xxx						
Labeo bata (Hamilton)	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx			xxx	xxx		
Labeo boga (Hamilton)	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx			xxx	xxx	xxx	
Labeo boggut (Sykes)	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx			xxx			
Labeo caeruleus Day	xxx														
Labeo calbasu (Hamilton)	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx			xxx	xxx	xxx	xxx
Labeo dero (Hamilton)	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx			xxx	xxx	xxx	
Labeo devdevi Hora														xxx	xxx
Labeo diplostomus (Heckel)	xxx	xxx										xxx			
Labeo dussumieri (Valenciennes)										xxx	xxx				
Labeo dyocheilus dyochelius (McClelland			xxx	xxx		xxx	xxx	xxx	xxx			xxx	xxx		

TABLE

Name of *Labeo* species	Pakistan	INDIA									Sri Lanka	Bangladesh	Nepal	Myanmar	Thailand
		Ganges	Yamuna	Brahmaputra	Mahanadi	Godavari	Krishna	Cauvery	Western Ghats						
									Eastern face	Western face					
Labeo dyochelius Pakistanicus Mirza & Awan	xxx														
Labeo fimbriatus (Bloch)	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx		xxx	xxx	xxx	
Labeo fisheri Jordan & Starks											xxx				
Labeo gonius (Hamilton)	xxx	xxx	xxx	xxx	xxx	xxx	xxx					xxx	xxx	xxx	
Labeo kawrus (Sykes)							xxx	xxx	xxx						
Labeo kontius (Jerdon)									xxx	xxx					
Labeo microphthalmus Day	xxx	xxx													
Labeo nandina (Hamilton)		xxx		xxx								xxx		xxx	
Labeo nigrescens Day							xxx			xxx					
Labeo nigripinnis Day	xxx														
Labeo pangusia (Hamilton)	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx				xxx	xxx		
Labeo porcellus (Heckel)						xxx	xxx				xxx				
Labeo potail (Sykes)						xxx	xxx								
Labeo rohita (Hamilton)	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	
Labeo stoliczkae Steindachner														xxx	

species are known from the Indian region and the distribution chart presented (Table) shows distinct patterns.

(A) Species which are widely distributed and as such are not of much zoogeographical importance.
(1) *Labeo rohita* (Ham.)
(2) *Labeo calbasu* (Ham.)
(3) *Labeo pangusia* (Ham.)
(4) *Labeo boga* (Ham.)
(5) *Labeo fimbriatus* (Bloch)
(6) *Labeo dero* (Ham.)
(7) *Labeo gonius* (Ham.)

(B) Species which are confined to India, Pakistan, Bangladesh, not extending to adjacent countries as Myanmar and beyond.
(1) *Labeo bata* (Ham.)
(2) *Labeo boggut* (Sykes)
(3) *Labeo dycheilus dyocheilus* (McClelland)

(C) Species which are confined to the Himalayan drainage (Ganga, Yauna and Brahmaputra) system
(1) *Labeo diplostomus* (Heckel)
(2) *Labeo dyocheilus pakistanicus* Mirza and Awan
(3) *Labeo microphthalmus* Day
(4) *Labeo nandina* (Ham.)
(5) *Labeo nigripinnis* Day
(6) *Labeo caeruleus* Day

(D) Species endemic to Myanmar and Thailand

(1) *Labeo stoliczkae* Steindachner
(2) *Labeo devdevi* Hora

(E) Species which is present up to Mahanadi and Godavari

(1) *Labeo angra* (Ham.)

(F) Species confined only to south India.

(1) *Labeo ariza* (Ham.)
(2) *Labeo dussumieri* (Val.)
(3) *Labeo kawrus* (Sykes)
(4) *Labeo kontius* (Jerdon)
(5) *Labeo nigrescens* Day
(6) *Labeo potail* (Sykes)

(7) *Labeo porcellus* (Heckel)

(G) Species which is endemic in Sri Lanka only

(1) *Labeo fisheri* Jordan and Starks

(H) Species which are confined to Pakistan (Baluchistan) only

(1) *Labeo gedrosicus* Zugmayer
(2) *Labeo macmahoni* Zugmayer

It is well known that the Indian sub-region of the Oriental Region has perhaps the largest number of fish genera representing nearly 63% of the 89 primary fresh water genera known. Jayaram (1974), while discussing the ecology and distribution of freshwater fishes, considered *Labeo* as an Ethiopian element represented by ancient well-stabilized species occuring in a wide range of ecological niches, but preferably streams in plains.

It is worthwhile to analyse the above pattern of distribution and causative factors. As Rosen (1978) aptly stated, for a practising biogeographer the choice of the species as a fundamental evolutionary unit is indispensable.

The seven species which are widely distributed merit little consideration. Species as *L. rohita, L. calbasu* and *L. fimbriatus* are extensively cultured and transplanted. Their natural distribution as such has become insignifcant. Species as *L. dero* and *L. gonius* are closely related to *L. bata* and *L. boggut*, extensively overlapping in the Gangetic drainage system of the Himalayas.

In a similar manner, the three species *L. bata, L. boggut* and *L. dyocheilus dyochelius,* which are widely distributed in the main Indian land mass but absent in Myanmar and beyond are also not of much value. It would seem that these species were unable to colonise the Irrawaddy system because their evolution was later than the formation of Arakan Yoma (Myanmar). The Garo hills are a remnant of the peninsular shield and are of Cretaceous age, older than the Pleistocene Himalayan range. With the rise of Himalaya due to the orogenic movements in the late Pleistocene with the subsidence of the Tethys sea, the Himalayan range had to buckle and bend north to south over the stable Garo hills to form the Arakan Yoma, and the Irrawaddy and Salween draiages. Evidently, it would appear that *L. boga, L. boggut* and *L. dyocheilus dyocheilus* evolved later. It is worth noting that the Western Himalayan form of *Labeo dyocheilus dyocheilus* had already been described as a separate subspecies *L. dyocheilus pakistanicus* by Mirza and Awan (1976). Mukerji (1934) commented that *L. dyocheilus* is a very variable species and that the Eastern Himalayan form is distinct from the Western Himalayan one. Das and Jayaram (1981) statistically analysed the population and considered the Burmese form as *L. devdevi.* These indicate the more recent evolution of these species in relation to the Himalayan uplift and orogeny. Six species *L. caeruleus, L. diplostomus, L. dyocheilus pakistanicus, L. microphthalmus, L. nandina* and *L. nigripinnis* are confined to the Himalayan drainage

system and have not spread below the Vindya-Satpura range of mountains. *L. caeruleus, Labeo diplostomus, L. microphthalmus* and *L. nigripinnis* are all derivatives of *L. dero* which is found all along the Himalaya including the Sind hills and Myanmar. Mukerji (1934), Hora (1936) showed the close relationship and variation in *L. dero* and the varying features of *L. dero* from Myanmar and Thailand. Mukerji (1934) considered the Eastern Himalayan and Assamese form of *L. dyocheilus* as representing the forma-typica. It will be clear that the above species, evolved from a stock of *L. dero* and *L. dyocheilus* like fishes spread along the Himalaya in recent times *i.e.* Pilestocene.

Two species endemic to Myanmar are *L. stoliczkae* and *L. devdevi*. The second species is the Myanmarese form of *L. dero* and was described as a new species by Hora (1936). *Labeo stoliczkae* is derived from *L. rohita*. These are also of recent origin.

The species of Peninsular India represent the geologically older groups and are zoogeographically interesting.

Seven species are confined to drainage below the Vindhya-Satpura range of mountains. Of these, *L. angra* is the only species not found below Godavari. *L. porcellus* found in Pune is absent from the intervening areas and has differentiated as a subspecies in Sri Lanka.

Similarly, *L. fisheri* related to *L. potail* is endemic to Sri Lanka; the latter is found in the Krishna system. *L. dussumieri* and *L. nigrescens* are confined to the Western Ghats, while *L. kontius* is confined to the Cauvery river system. *L. ariza* and *L. kawrus* were originally recorded from Cauvery river system and Western Ghats respectively, but now they are found throughout Peninsular India. This pattern of discontinuous distribution or patchy distribution is indicative of older geological origin. It is well known that the Peninsular Shield is a remnant of the Gondwana land mass and is of Precambrian age. Some species from Peninsular India are directly related to the Gangetic *L. rohita* and *L. calbasu*, which are highly adaptable to all niches. It may be that the original stock of these peninsular endemic species, differentiated into the gangetic forms when colonising the Ganges drainage. Also, due to several physiographic changes in the Peninsula such as the Deccan trap formation, tilting of the Peninsula from west to east (Menon, 1952) and also man made changes, these Peninsular species got obliterated from the wider range of distribution and became isolated. Whatever may be the cause, it is clear that the peninsular species are of earlier origin and are the original inhabitants of the Indian Peninsula.

Though Sri Lanka is now seperated by the shallow and narrow Palk Strait, it was a part of the mainland of the Peninsula even during the upper Pleistocene times. The occurrance of many Western Ghat species in Sri Lanka and specific and inter-specific divergence in the Island population is well documented (Jacob, 1949), (Silas, 1952) and Pethiyagoda (1991). It is pertinent to point out here the description of *L. porcellus lankae* by Deraniyagala (1952) from Sri Lanka which is derivative of the main land nominal form. However, it has been synomymised for reasons discussed elsewhere.

Phylogeny

Fishes of the genus *Labeo* are prolific in Africa and they have especially diversified with 49 species in the lentic habitats of that continent. Prior to discussing the fossil evidence for this group's phylogeny, it must be conceded that the most intriguing gap in the African fossil record is the absence of any ostariophysians prior to Eocene. The earliest known African characoid, the ancestor of Cyprinidae, is Pilocene in age (Greenwood, 1972, 1974). The earliest known Cyprinine fossil, a doubtful *Barbus*, is from late Miocene, and of *Labeo* is from the Pilocene. Also, it is a fact that the most generalised species of *Labeo* occur in Africa rather than in India and in the Oriental region. Thus it is clear that the genus *Labeo* is an Ethiopian element introduced into the Indian fauna, having its origin from the Pilocene period, much before the Himalayan upheaval in the Pleistocene. In tracing the Phylogeny of any group, we must remember the axiom that life evolved by way of some unit of population (i.e. a species or group of species) changing through time, and in doing so produces two or more groups where there was only one before they become extinct. Such kinship can be distinguished by the presence of ancestral characters as opposed to acquired.

For instance, compared to the Afican *Labeo* species the Indian ones are more inhabitants of lotic than of lentic waters, which itself is an advanced adaptation. Moreover *Labeo* species of Indian waters are mostly vegetable or detritus feeders and for this purpose thay have adapted different modifications of lip structure in consonance with the habitat. Some species are coloumn feeders.

We shall now discuss the evolution of the species groups, adapted characters and their inter-relationships.

Lips : Concurrent with the diet a fish eats, specialization has occurred in lip and mouth structure. From a harmless plant eater, gradual transformation has taken place to scrapers, diggers and biters.

Species as *Labeo ariza, L. boga, L. boggut, L. dero, L. dyocheilus* and *L. pangusia* have nearly a teminal mouth, with a well defined labial groove and lips with papillae, large tubercles (*L. dero*), or a series of ridges (*L. dyocheilus*) (plates I & II). These are scrapers, some of them, as *L. dyocheilus*, living in deeper parts of swift-flowing rivers; *L. dero* at the sides of torrential stream is a shallow water form (Hora, 1936). Even in these fishes, the gradual transition from a simple, terminal mouth (*L. dero*) to deeply set, thick lips (*L. dyocheilus*) can be seen. *L. dero, L. boga* and *L. ariza* live in shallow streams and ponds, scraping algae attached to stones; *L. boggut, L. dyocheilus* and *L. pangusia* live in fast flowing streams and are able to resist being washed away; the latter are hence better evolved than the former three.

Species as *L. fimbriatus, L. porcellus, L. potail* with a hanging inferior mouth and thickly papillated lips are bottom diggers, feeding in detritus on the bed of the river and on the benthic flora (plate II). These are less evolved than the previous groups and are mostly inhabitants of shallow tanks and ponds. Of these *L. porcellus* is better evolved than other two in view of its elaborately defined lip structure with rostral papillae and a deep lateral groove.

Eyes : In most species of *Labeo* the eyes are of medium size and are placed in the upper half of the head so that they are not visible from below the ventral surface. *Dero* and *Ariza* groups however differ. *L. potail* has somewhat lowly placed eyes. It would appear that *L. dero* and *L. pangusia* are not so advanced in respect of these two characters (viz. size and position).

Barbels : Like in catfishes, the barbels are used for sensory purposes. There are one or two pairs of short barbels. When only one pair is present, it is the rostral pair which is absent. The barbels are less specialized and may be homologous to those of Siluroids.

Tubercles : These are aggregations of mostly non-keratinized epidermal cells, confined to the most superficial layer of cells. *Dero* and *Porcellus* group have hard tubercles, but these can't be stated to be contact organs (Collette, 1977).

Mouth : *Fimbriatus, Porcellus* and *Potail* groups have protractile mouths, unlike others. The maxillary bone is excluded from the gape in these groups and a protractile mouth is considered a specialised mechanism.

Teeth : Jaws are edentate as are the palatines. Most of the early cyprinid fishes were with edentulous palates and as such, absence of teeth is a nonspecialized character.

Dorsal fin : This fin is typically situated midway between tip of snout and caudal fin base. The fin rays are invariably soft and flexible without any spine. Adipose fin is absent. these are nonspecialzed characters.

Scales : Body is always completely scaled, the number and size varying in the species. Species as *L. boggut* have 50-80 scales on lateral line, whereas most others have 35-45; presence of scales is again not a specialized feature. Species with larger number of scales are less advanced than those with fewer numbers.

INTER-RELATIONSHIPS

Based on the above character analysis, the 28 species of the genus are classified into 8 groups or complexes, each interrelated to others. The character of 8 groups are given in Table below and their specialization or less advanced nature, as compared to other groups are discussed.

Complex	Eye	Barbels	Scales	Tubercles	Dorsal fin	Mouth	Teeth
gonius	medium not visible	4 barbels, except *L.boggut* 2 barbels	50-80	smooth	ii or iii near the snout	non-protractile	absent
pangusia	small not visible	2 barbels (maxilary pair)	40-42	smooth	ii or iii near the snout	non-protractile	absent
dero	small not visible	2 barbels (maxilary pair)	40-43	keratinized	ii or iii midway	non-protractile	absent
porcellus	medium not visible	4 barbels except *L. stoliczkae*	38-47	hard	ii or iii midway	protractile	absent
fimbriatus	medium visible	4 barbels	40-47	smooth	ii or iii near the snout	protractile	absent
ariza	medium not visible	2 barbels (maxillary pair)	37-42	smooth	ii near the tip of snout	non-protractile	absent
boga	medium not visible	2 barbels (maxillary pair)	37-38	smooth	ii or iii near the snout	non-protractile	absent
potail	medium visible	2 barbels (maxillary pair)	39-40	smooth	ii near the snout	protractile	absent

Small eyes placed above are conservative in its influence and especially in its feeding habits. Species of *Labeo* which are mostly herbivorous or atleast insectivorous and with superiorly placed eyes are at a disadvantage. On the other hand, medium sized eyes and varying position go well with their feeding habits. From this, it would appear that *Dero* and *Pangusia* groups are less advanced than others; *Fimbriatus* and *Potail* groups with eyes visible from below by being placed low, have a better advantage in food selection and are more advanced.

Barbels of carps are considered less specialized than those of cat fishes. The absence or reduction in their number is indicative of less specialized nature. However, this character does not give much evolutionary evidence as the number of barbels in *Labeo* also vary inter-specifically.

A large number of scales is a retrograde character. On this scale, the *Gonius* group can be considered less specialized than others. The *Boga* group with 37/38 scales is considered more advanced.

Nuptial tubercles are indicative of sexual adaptation and are not of any phylogenetic significance. In most *Labeo* groups the snout is smooth; a few, mostly males, may exhibit tubercles at the time of sexual maturity.

In a similar manner, the position of the dorsal fin, paired fins, and absence of any ossified rays, are all generalized characters without significance. A large number of fin rays as in *fimbriatus, nigrescens* and *nandina* are retrograde character.

As already stated, the protractile mouth is a highly specialized mechanism. In most *Labeo* species the mouth is non-protractile. The maxilla and premaxilla are unified and the former is excluded from the gape of the mouth and the latter alone bind the mouth. In this respect, the genus itself can be stated to be less advanced than other genera of Cyprininae.

Jaws and palate are edentate. The quadrate is covered over by the ecto and endopterygoid. Meckel's cartilage is replaced by an ossified articular bone. Teeth, as in siluroids are adapted characters, increasing the choice of food and also holding the jaw. *Labeo* as a group is less specialized than other cyprinine genera.

The opercular series is complete with an opercle, prepercle, subopercle and interopercle. In advanced groups, the subopercle is absent and the opercle is distinctive.

Branchiostegal rays are invariably three, which is again a retrograde feature. The articulation of palatine with vomer and metapterygoid is slightly movable. The palatines are attached by ligaments to ethmoid, premaxillary and maxillary. Branchial arches are five. The inferior pharyngeal bone is a powerful masticating plate provided with teeth.

The post-temporal fossa is absent. The parietal is a large rectangular bone and forms a part of roof of the cranial cavity. The pectoral girdle includes post-temporal, supra-cleithrum, cleitrum, coracoid, meso-coracoid and scapula. The pelvic bones are bifurcated anterorily. Pelvic fin rays are mostly nine. The caudal skeleton is a relatively generalised structure, there are two epiurals and a single pair of uroneurals. Principle caudal rays are generally 10+9.

A summary of the character state is presented in the table below.

(+) indicates progressive or divergent state
(-) loss or reduction
(0) means primitive

The total amount of divergence amongst the groups help us in determining the inter-relationships and evolution.

Groups	Eyes	Barbels	Scales	Dorsal fin rays
1. *gonius*	(-)	(0)	(-)	(+)
2. *pangusia*	(0)	(-)	(-)	(+)
3. *dero*	(0)	(-)	(-)	(+)
4. *porcellus*	(-)	(+)	(+)	(0)
5. *fimbriatus*	(+)	(+)	(-)	(0)
6. *ariza*	(-)	(-)	(+)	(+)
7. *boga*	(-)	(-)	(+)	(+)
8. *potail*	(+)	(-)	(+)	(+)

From the above analysis it would sem that the *Potail* group is the most advanced followed by *Ariza* and *Boga* groups. The most primitive group appears to be *Gonius*, followed by *Pangusia* and *Dero*; the *Fimbriatus* and *Porcellus* groups are intermediary.

Evolution of the genus

From the fossil history and character analysis it is clear that the genus *Labeo* evolved only in the Tertiary era and is a less specialized cyprinid than the other barbine genera.

In considering the lip structure it would appear that its ancestors must have been without such adaptations. Similarly, the non-protractile mouth, edentate palate and jaws show that the earlier forms were inhabitants mostly of lentic habitats where efforts for foraging for food and reproduction were not conservative as protection and shelter etc.

Amongst the Cyprininae, genera as *Schizothorax, Puntius (Barbus), Cirrhinus, Tor* and *Catla* share some character or other with *Labeo*. The question of Cyprinoid relationships is perplexing and more so the relationship between the genera themselves.

Tor and *Barbus* are closely related; *Catla, Cirrhinus* and *Labeo* are akin in some features though *Catla* stands distinct in body form and structure. *Oreinus* or *Schizothoraz* are specialized genera adapted for entirely a different habitat. They are in a different subfamily altogether. However, the body form, presence of labial fold, squamation, lip structure and a median position of the fins are some of the characters also shared by *Labeo*. Moreover the lentic habitat of many species in Africa appear to be a vestige of ancestors which may also have lived in confined waters.

Fishes of Schizothoracinae, *Oreinus* or *Schizothorax* have been recorded from Pleistocene time deposits of Ningal Nullah near Gulmarg in Kashmir (Hora and Menon, 1953), a period later than the origin of *Barbus* and *Labeo* whose fossil records date from the later Pilocene. The tile-like anal scales are a distinct features of Schizothoracinae. It is more likely that the Schizothoracinae evolved from a *Barbus* like ancestor (Mirza and Hameed, 1975). Banarescu (1960) also opines that the fishes of the subfamily Schizothoracinae originated in South-east Asia and dispersed westwards along the northern face of the Himalaya in the middle Pilocene.

In view of the aforesaid reasons, the origin of *Labeo* from Schizothoracinae ancestors is improbable. We may have to look for its ancestors within the Cyprininae proper.

Regan (1922) was of the view that Cyprinoidea originated in India and Southeast Asia. He was of the opinion that Cyprinidae as a family did not reach Europe before the Oligocene and that North America, which remained isolated during the Eocene, gained its connection with Asia in the Oligocene. It is generally conceived that Cyprinidae arrived in Africa from Asia at a relatively late date, possibly earlier than the Miocene (the oldest known Cyprinid fossils in Africa date from that period). This confirms that the ancestors of *Labeo, Barbus,* etc, which are known from the Pliocene time evolved later.

In the proliferation of species *Barbus* stands first, followed by *Labeo* and *Cirrhinus*. In many respects *Labeo* is akin to *Barbus*. Characters as the edentate palate, medium sized scales, position of the dorsal fin, short pectoral and pelvic fins, mouth structure and barbels, explicitly reveal the close relationship of *Labeo* to *Barbus*. Some species of *Barbus* show nuptial tubercles (*P. filamentosus, P. sahyadriensis, P. arulius*). *P. lithopidos* has a cartilaginous covering on either jaw. The barbels when present are also small and short as in *Labeo* and the number also, either one or two pairs.

The number of lateral line scales also range from 20 to 47, dorsal fin rays 9 to 13.

Jayaram (1991) considered that the genus *Puntius* is not monophyletic, which view was corroborated by the findings of Taki *et al.* (1978) and Magtoon and Arai (1989).

It would thus appear that *Labeo* evolved from one of the phyletic branches of a *Barbus* like ancestor. Further, detailed studies on the food habits, reproduction, biology, sensory adaptations, physiology, or behaviour alone could throw light on the phyletic linkages not only of *Labeo* but also of the allied genera. Unfortunately, there is virtually no previously published information. It is pertinent to point out here that Reid (1985) in his revision of the African species of *Labeo* also concluded that the species groups constituting the genus *Labeo* in Africa are not necessarily monophyletic and that out of the six species groups recognised by him, five of them have their close relationship with Asian species.

It is thus concluded that *Labeo* arose from a *Barbus* like ancestor later than the Pliocene and evolved into different groups in the Indian subcontinent, after an invasion from Africa. *Labeo* is consequently an Ethiopian element.

Frequency Distribution of Meristic Characters of different species of *Labeo* fin rays

No.	Species	Dorsal	Pectoral	Pelvic	Anal	Caudal
1.	*L. gonius*	ii,14/2; ii,15/5; ii,16/4	i,14/4; i,15/7	i,8/11	ii,5/11	10+9/11
2.	*L. boggut*	ii,9/24; ii,10/1	i,14/6; i,15/6; i,16/13	i,8/25	ii,5/25	10+9/25
3.	*L. dussumieri*	iii,12/1; ii,13/2; ii,14/3	i, 16/5; i,17/1	i,8/6	ii,5/6	10+9/6
4.	*L. pangusia*	ii,12/9; ii,10/10 ii,11/4	i,14/5; i,15/4 i,16/4	i,8/23	ii,5/23	10+9/23
5.	*L. angra*	ii,10/5; ii,11/10	i;15/12; i,16/3	i,8/15	ii,5/15	10+9/15
6.	*L. dero*	ii,9/4 ii,10/18; iii,10/3	i,15/8; i,16/17	i,8/25	ii,5/25	10+9/25
7.	*L. diplostomus*	ii,11/6	i,17/6	i,8/6	ii,5/6	10+9/6
8.	*L. dyocheilus dyocheilus*	ii,9/8; ii,10/13; iii,10/1	i,14/4; i,15/8; i,16/10	i,8/22	ii,5/22	10+9/22
9.	*L. devdevi*	ii,12/6	i,15/6	i,8/6	ii,5/6	10+9/6
10.	*L. porcelus*	ii,12/3; ii,13/4 ii,14/2	i,15/9	i,8/9	ii,5/9	10+9/9
11.	*L. kontius*	ii,12/1; iii,12/6, ii,13/2; iii,13/5 ii,14/1	ii,15/9; i,16/6	i,8/15	i,5/15	10+9/15
12.	*L. nigrescens*	iii,14/3; ii,15/1	i,15/3; i,16/1	i,8/4	ii,5/4	10+9/4
13.	*L. stoliczkae*	iii,13/2	i,15/1; i,16/1	i,8/2	ii,5/2	10+9/2
14.	*L fimbriatus*	ii,15/5; iii,15/3; ii,16/10; iii,16/11 ii,17/4; iii,19/6	i,14/16; i,15/23	i,8/39	ii,5/11; iii,5/28	10+9/39
15.	*L. calbasu*	iii,12/2; iii,13/23 iii,15/12	i,15/15; i,16/22	i,8/37	ii,5/33 iii,5/4	10+9/37
16.	*L. nandina*	ii,22/1; ii,23/2 iii,24/1	i,17/4	i,8/4	iii,5/4	10+9/4
17.	*L. rohita*	ii,12/10; iii,12/7 ii,13/8; iii,13/6 ii,14/1	i,15/15; i,16/17	i,8/32	ii,5/19 iii,5/13	10+9/32
18.	*L. ariza*	ii,9/8	i,14/8	i,8/8	ii,5/8	10+9/8
19.	*L. bata*	ii,9/11; ii,10/5	i,15/4; ii,16/12	i,8/16	ii,5/16	10+9/16
20.	*L. boga*	ii,8/2; ii,9/55	i,15/55; i,16/2	i,8/57	ii,5/57	10+9/57
21.	*L. kawrus*	ii,9/2; iii,9/2	i,15/4	i,8/4	ii,5/4	10+9/4
22.	*L. potail*	iii,11/3; ii,12/16	i,14/6; i,15/13	i,8/9	ii,5/19	10+9/19
23.	*L. caeruleus*	ii,12/3	i,16/3	i,8/3	ii,5/3	10+9/3

Frequency Distribution of Meristic Characters of different species of *Labeo* scales

No.	Species	Scales : Lateral line	Predorsal	Prepelvic	Preanal
1.	*L. gonius*	65/3; 69/1; 70/1; 73/1; 74/1 75/1; 76/1; 79/1; 80/1	20/3; 22/1; 23/1; 24/4; 25/2	18/2; 19/1; 20/2; 21/2; 22/3; 23/1	44/2; 46/3; 47/2; 53/1; 54/2; 57/1
2.	*L. boggut*	55/1; 56/6; 57/3; 58/1; 59/2 60/3; 62/2; 63/3; 64/1; 65/3	19/5; 20/10; 21/7; 22/3	18/11; 19/4; 21/3; 22/4; 23/1; 24/2	35/5; 36/8; 37/6; 38/4; 39/2
3.	*L. dussumieri*	50/2; 51/1; 53/2; 55/1	16/3; 17/3	14/1; 15/3; 16/2	30/1; 31/2; 33/1; 34/2
4.	*L. pangusia*	40/8; 41/2; 42/13	11/6; 12/7; 13/9; 14/1	9/3; 10/4; 11/6; 12/9; 13/1	23/11; 24/9; 25/9
5.	*L. angra*	42/15	12/11; 13/3; 14/1	9/3; 10/8; 11/3; 12/1	23/9; 24/3; 26/3;
6.	*L. dero*	41/2; 42/16; 43/7	13/6; 14/11; 15/8	10/2; 11/22; 12/1	23/7; 24/15; 25/3
7.	*L. diplostomus*	41/1; 42/3; 43/2	14/3; 15/3	10/2; 11/4	23/2;24/4
8.	*L. dyocheilus dyocheilus*	40/6; 41/6; 42/6; 43/4	12/14; 13/4; 14/4	10/1; 11/2; 12/19	24/1; 25/5; 26/11; 27/5
9.	*L. devdevi*	40/4; 41/2	17/2; 18/4	10/2; 11/1; 12/3	23/3; 24/3
10.	*L. porcellus*	38/2; 39/5; 40/2	13/4; 14/5	9/4; 10/4; 11/1	21/2; 22/4; 23/3
11.	*L. kontius*	39/1; 40/10; 41/1; 42/3	12/1; 13/2; 14/11; 15/1	10/9; 11/4; 12/2	22/1; 23/3; 24/8; 25/3
12.	*L. nigrescens*	36/3; 37/1	10/1; 12/3	10/3; 12/1	23/3; 24/1
13.	*L. stoliczkae*	46/3; 47/1	12/1; 13/3	15/1; 16/3	25/1; 28/3
14.	*L. fimbriatus*	42/2; 43/5; 44/5; 45/15; 46/6; 47/6	16/10;17/19; 18/10	12/12; 14/7 13/20;	26/15; 27/21 28/3
15.	*L. calbasu*	40/22; 41/9; 42/3; 43/2; 44/1	10/7; 11/5; 12/3; 13/8; 14/4	22/1; 23/13; 24/22; 26/1	9/3; 10/7; 11/12; 12/15
16.	*L. nandina*	42/3; 44/1	12/4	10/3; 11/1	25/4
17.	*L. rohita*	40/7; 41/14; 42/9; 43/2	13/7; 14/24; 15/1	10/15; 11/10; 12/7	23/6; 24/11; 25/11; 26/4
18.	*L. ariza*	38/6; 39/2	12/5; 13/3	8/1; 9/6; 10/1	23/3; 24/5
19.	*L. bata*	37/4; 38/5; 39/3; 40/4	12/6; 13/6; 14/1; 15/3	10/7; 11/9	22/5; 23/3; 24/6; 25/2

No. Species	Scales : Lateral line	Predorsal	Prepelvic	Preanal
20. *L. boga*	37/16; 38/31; 39/10	10/17;11/26 12/11; 13/3	10/16; 11/3; 12/24;13/10 14/4	21/4; 22/6; 23/6; 24/37 25/4
21. *L. kawrus*	38/4	11/2; 12/2	9/1; 10/1 11/2	22/3; 23/1
22. *L. potail*	39/8; 40/10; 41/1	12/2; 13/7; 14/10	9/4; 10/11; 11/4	21/1; 22/2; 23/9; 24/6; 25/1
23. *L. caeruleus*	40/2; 41/1	13/1; 14/2	16/1; 17/1; 18/1	25/1; 26/2

Frequency distribution of meristic characters in species of *Labeo* scales

No. Species	Dorsal fin base. L.l.	Pelvic fin base. L.l.	Anal fin base. L.l.	Circumpeduncular
1. *L. gonius*	12 12 1/2 14 2 1 8	10 10 1/2 11 1/2 1 1 1 12 12 1/2 13 3 3 2	8 8 1/2 10 1 1 2 10 1/2 11 4 3	25 26 27 28 1 3 3 4
2. *L. boggut*	10 1/2 11 11 1/2 8 1 13 12 12 1/2 2 1	8 1/2 9 23 2	8 1/2 9 15 4 9 1/2 7	26 27 28 31 32 6 4 11 2 2
3. *L. dussumieri*	8 1/2 9 9 1/2 2 1 8	5 1/2 6 1/2 4 2	5 1/2 6 1/2 4 2	21 22 23 2 2 2
4. *L. pangusia*	7 1/2 8 8 1/2 5 9 9	5 1/2 6 6 1/2 4 3 16	5 1/2 6 1/2 3 2	20 21 22 23 24 8 11 2 1 1
5. *L. angra*	7 7 1/2 8 8 1/2 6 1 4 4	5 1/2 6 6 1/2 3 7 5	6 6 1/2 7 3 6 6	20 21 22 1 3 11
6. *L. dero*	8 1/2 9 9 1/2 11 11 3	6 1/2 7 7 1/2 7 12 6	6 1/2 7 4 12 7 1/2 9	22 23 24 26 4 11 9 2
7. *L. diplostomus*	8 1/2 9 4 2	7 1/2 8 1/2 1 5	7 1/2 6	24 25 3 3
8. *L. dyocheilus dyocheilus*	7 1/2 8 8 1/2 13 3 6	5 1/2 6 6 1/2 2 6 13	5 1/2 6 9 5 6 1/2 8	19 20 22 23 3 6 10 4

No. Species	Dorsal fin base. L.l.	Pelvic fin base. L.l.	Anal fin base. L.l.	Circumpeduncular
9. *L. devdevi*	7 7 1/2 8 3 2 1	5 1/2 6 6 1/2 2 1 3	5 1/2 6 3 1 6 1/2 2	19 20 21 1 3 2
10. *L. porcellus*	7 1/2 8 8 1/2 6 2 1	5 1/2 6 6 1/2 3 3 3	6 6 1/2 7 2	20 21 22 4 2 3
11. *L. kontius*	8 8 1/2 9 7 7 1	5 1/2 6 1/2 6 3 5 7	6 7 6 1/2 1 6 8	21 22 8 7
12. *L. nigrescens*	7 7 1/2 2 2	5 1/2 6 3 1	6 6 1/2 1 1	19 20 1 3
13. *L. stoliczRae*	9 1/2 10 1/2 1 1	7 1/2 8 1/2 1 1	6 1/2 7 1/2 1 1	21 2 1 1
14. *L. fimbriatus*	9 1/2 10 10 1/2 23 3 13	6 1/2 7 7 1/2 29 4 6	6 1/2 7 5 2 7 1/2 32	20 21 22 23 24 1 3 12 21 2
15. *L. calbasu*	7 1/2 8 8 1/2 27 4 4 9 1/2 2	5 1/2 6 6 1/2 15 11 11	5 1/2 6 13 5 6 1/2 19	18 19 20 21 22 5 7 7 6 10 23 1
16. *L. nandina*	7 1/2 8 3 1	6 4	6 4	21 22 3 1
17. *L. rohita*	7 1/2 8 28 4	5 1/2 6 6 1/2 6 6 20	5 1/2 6 4 2 6 1/2 26	20 21 22 4 19 9
18. *L. ariza*	7 1/2 8	5 1/2 6 1/2 4 4	5 1/2 2 6 1/2 6	18 19 3 5
19. *L. bata*	7 7 1/2 8 8 1/2 2 7 6 7	6 6 1/2 8 8	6 6 1/2 3 8 7 5	19 20 21 1 5 10
20. *L. boga*	7 7 1/2 2 55	5 5 1/2 2 55	5 1/2 6 1 56	18 19 20 21 7 5 43 2
21. *L. kawrus*	7 1/2 4	4 1/2 4	5 1/2 6 3 1	20 21 1 3

No. Species	Dorsal fin base. L.l.	Pelvic fin base. L.l.	Anal fin base. L.l.	Circumpeduncular
22. *L. potail*	8 1/2 8 15 4	5 1/2 6 1/2 2 17	6 1/2 7 6 6 7 1/2 7	20 21 22 23 1 8 4 6
23. *L. caeruleus*	7 7 1/2 1 2	6 6 1/2 2 1	5 1/2 6 1 2	20 21 2 1

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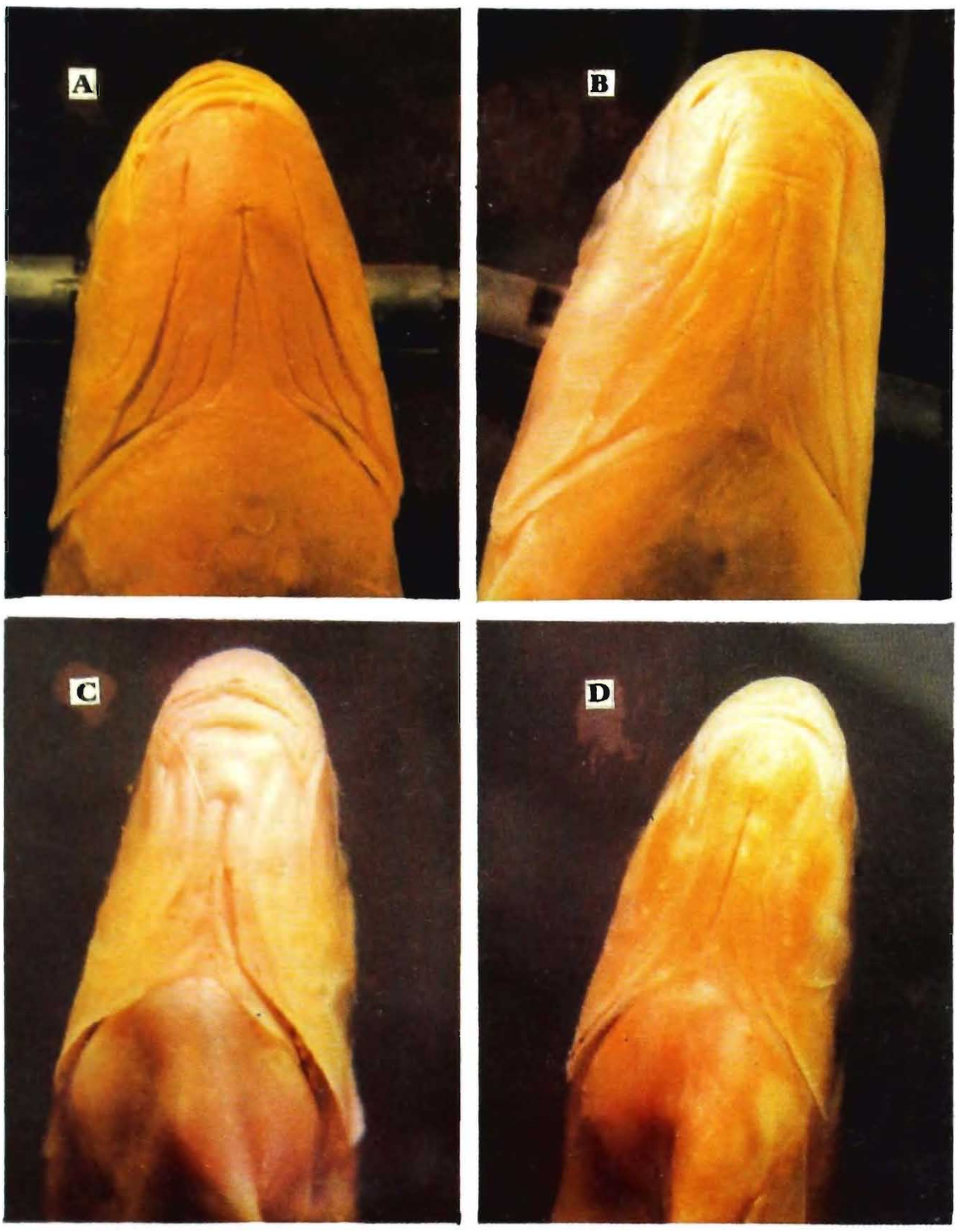
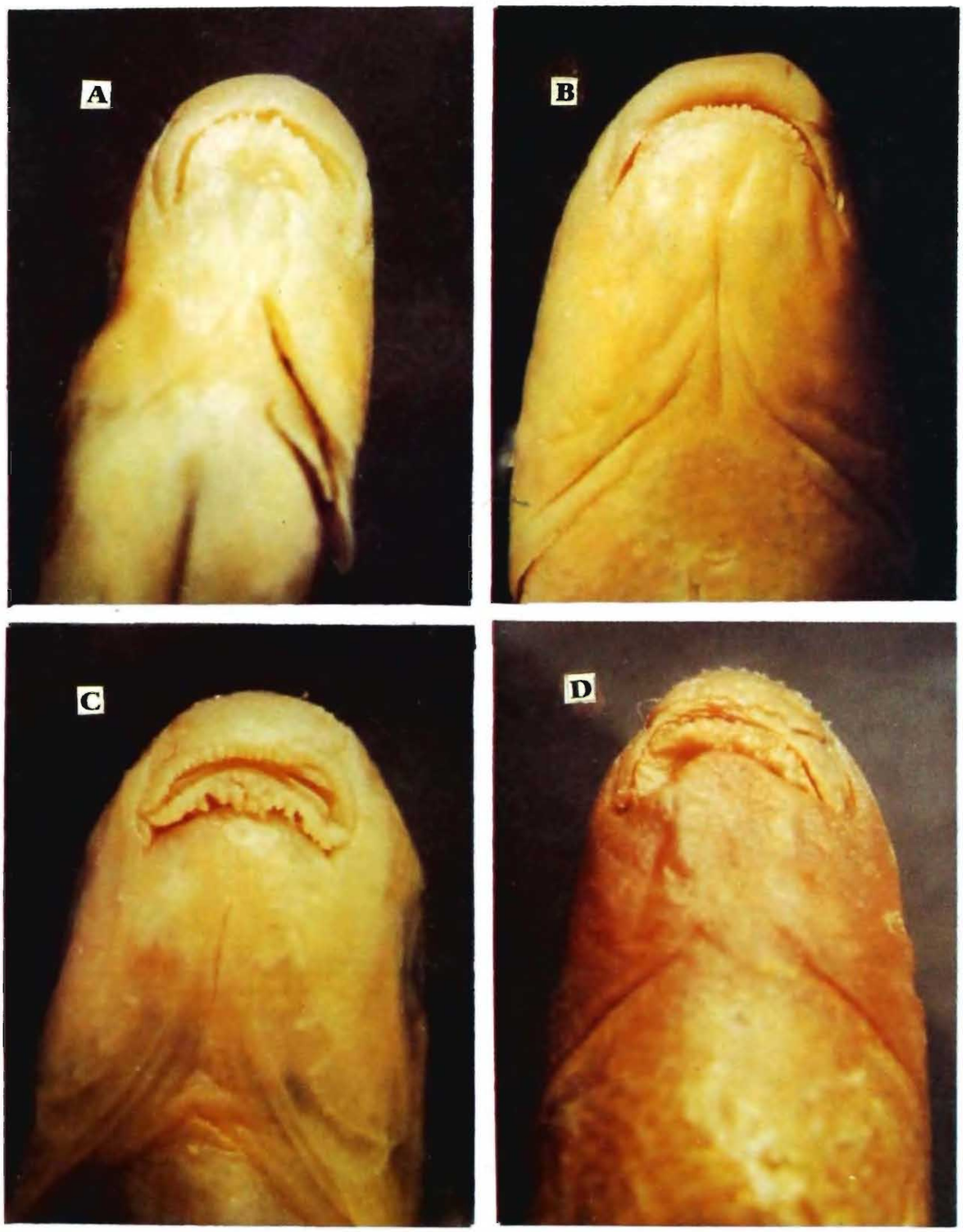
PLATE I



A. Ventral view of *Labeo ariza* (Hamilton); B. Ventral view of *Labeo boga* (Hamilton); C. Ventral view of *Labeo boggut* (Hamilton); D. Ventral view of *Labeo dero* (Hamilton)

PLATE II



A. Ventral view of *Labeo dyocheilus dyocheilus* (Hamilton); B. Ventral view of *Labeo pangusia* (Hamilton); C. Ventral view of *Labeo fimbriatus* (Hamilton); D. Ventral view of *Labeo porcellus* (Hamilton)