THE FISHES OF MYSORE STATE

I. Fishes of Kadur District

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Introduction

A PERUSAL of the Ichthyological literature concerning the peninsular India shows that while detailed work has been done on the fishes of Malabar by early workers such as Bloch, Cuvier and Valenciennes, Jerdon and Day there are merely scattered references on a few species of fish from the Mysore State. From the point of view of fish fauna this important part of the Deccan plateau is still an unexplored region. A detailed collection of fishes from the Malnad districts of the State was first made in 1917 by one of us (Rau) and they were described by Professor C. R. Narayana Rao. Then in 1927 Professor Narayana Rao and Mr. Seshachar published an account of the fresh-water fishes of Mysore. Later Mr. D. D. Mukerji and Dr. S. L. Hora have contributed to our knowledge of collections of fishes from the Mysore State. We propose to make a detailed systematic study of the fishes from different parts of the State. In the present part of this paper the fishes taken from the Kadur District have been described. Accounts of fishes from the other parts of the State will be published as and when the collections are made.

The Mysore plateau presents such varied types of habitats for fishes that it is essential to have a knowledge of its physical features. An apt description of this part of the country is contained in the "Manual of Geology of India" by R. D. Oldham,—"In the peninsular India the mountains are all remnants of large table lands, out of which the valleys and low lands have been carved, the valleys with a few exceptions, are broad and open, the gradients of the river low, and the whole surface of the country presents the gently undulating aspect characteristic of an ancient land surface". The Mysore State is the southern part of the Deccan plateau where the Eastern and Western Ghats meet. Hence the part of the country is enclosed by chains of mountains on the west, south and east. The total area of the State is 29,474 sq. miles. The elevation of the country in general is from
2,000 to 3,000 feet above sea level. The State is broadly divisible into two parts, the malnad and the maidan area with distinctive physical features. The malnad constitutes the magnificent hilly tracts on the western part of the State, with peaks ranging from 4,000 to 6,000 feet above sea level. In the valleys run large number of perennial hill streams and this part of the country is covered with thick tropical forest. The malnad has for a long time afforded an excellent environment for the evolution of a number of hill stream fishes. The rest of the State on the eastern side of malnad constitutes the maidan or the plain country having a gentle slope eastwards. This part of the State is covered by cultivable land with large number of tanks. 

There are three main river basins in the Mysore State separated from one another by a fairly distinct watershed extending from Ballalrayanadurga to Nandidurga and then south to Anekal, with one from Devarayandurga north to Pavagada. On the south of this ridge flows the Cauvery with its tributaries, Hemavati, Lokapavani, Shimsha, Arkavati, Lakshmanatirtha and Kabbani. On the eastern side, the northern and southern Pennar and Palar rivers take their origin in Nandidurga and flow eastwards into the Bay of Bengal. North of the line Tunga and Bhadra rivers arise in the Western Ghats and flow northwards joining to form Tungabhadra which joins the river Krishna beyond the borders of the State. The river Sharavati on the north-western side and Cauveri on the southern side while leaving the State do so suddenly through great heights (500 to 900 feet) forming magnificent waterfalls. 

The study of the fish fauna of the southern part of the Deccan plateau which is geologically a very ancient piece of land helps us considerably to examine the views of Dr. S. L. Hora regarding the origin and distribution of fresh-water fishes. In his paper on "Geographical distribution of Indian fresh-water fishes and its bearing on the probable land connections between India and the adjacent countries", Dr. Hora points out "As a result of a detailed study of the genera and species inhabiting these regions (India Indo-China, Siam, Malay Archipelago) I am definitely of the opinion that the fresh-water fish fauna of India in the main originated in south-eastern Asia, most probably in Indo-China, and spread westwards by successive waves of migration to India and later to Africa while the two masses of land were connected with each other". Between the Cretaceous and Tertiary periods this part of the peninsular India formed the highway for the migration of the fresh-water fish from south-eastern Asia (Indo-China) —their place of origin—to Africa. The fishes from the Assam Himalayas migrated to Western Ghats, via the then Satpura Range. During the early part of Tertiary it became disconnected and thus isolated. Though this
isolation gave rise to several new forms of fish in the Mysore plateau as
could be noticed from collections recorded from this area, still there are
highly interesting instances of closely related forms among Homalopteridae
and Thynnichthys and of exactly identical species such as Silurus cochin-
chinensis and Danio strigillifer in South India on the one hand and Assam
Hills, Eastern Himalayas and Burma on the other showing close relation-
ship between the forms of these areas. It is hoped that further detailed
study of the fishes of Mysore will throw more light on this aspect of
the geographical distribution of the fresh-water fishes in general.

Apart from the purely academic side of this work we desire to lay
emphasis on the practical utility to the State by the survey of the fishes of
Mysore. We have sometimes been asked by the Department of Public Health
in Mysore, to identify specimens of fish such as Haplochilus, Panchax and
species of Barbus which are helpful in the biological control of malaria and
guinea-worm disease. This work, when completed, will give an idea of the
distribution of these fishes in different parts of the State. The survey of
the fish fauna of any particular country is a necessary prelude to understand
the available resources for the establishment of fisheries. There are im-
mense resources in Mysore State for the development of fresh-water fisheries.
There are (a) big rivers such as the Cauveri with its tributaries, the Tunga,
Bhadra and Sharavati; (b) very large artificial lakes as Krishnarajasagara,
Sulekere, Marikanive; and (c) 38,080 tanks and long stretches of irrigation
canals. It is beyond the scope of this paper to discuss in detail the possi-
bilities of development of fisheries in the State. It is hoped to devote a
separate part of this series for this subject which would also include an ac-
count of the now available food and game fishes in Mysore.

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Museum, Bangalore. We are greatly indebted to Mr. M. S. Ramachendra
Rao, Director of Industries and Commerce, for much assistance. Our special
thanks are due to Dr. S. L. Hora of the Indian Zoological Survey, Calcutta,
for helpful suggestions and to Mr. A. S. Chandrasekhara Aiyar for helping
us in taxonomic work.

1. Fishes of Kadur District

The Kadur District is in the western part of the State and is composed
of the most mountainous region included within the limits of Mysore. On
the west is the mighty Western Ghat Range bordering the State and on the
eastern side is the Bababudan chain of mountains. Some of the highest
peaks in the State, Mulainagiri (6,317 feet), Kalhatti (6,155 feet), and Kudure
Mukha (6,215 feet) are within this district. The slopes of these lofty hills
are covered with thick forests through which run numerous fast flowing hill streams. These streams finally join one or the other of the bigger rivers. In higher reaches of these streams there are not many forms of fish excepting a small species of *Barbus*—*B. malanampyx*, *Nemachilus striatus* and *Danio strigillifer*. But lower down in the rivers there are excellent forms with marked colouration. The main watershed in the district divides the land into three slopes, northwards, southwards and eastwards. On the northern side are Tunga and Bhadra rivers being fed by the Western Ghats and Jagger Valley of the Bababudan Range. On the southern slope runs the Hemavati river which is a tributary of Cauvery. On the east of Bababudan range is the maidan country with Veda and Avati rivers which, before joining to form Vedavati and leaving the district, expand into two large tanks, Ayyanakere and Madagadakere.

Fishes were collected at eleven places in Kadur District. The names of localities with short notes on their physical features, list of specimens, collected in each locality and date of collection have been given below. Some of the specimens in our collection such as *Silurus cochinchinensis*, *Bhavania annandalei*, and *Danio strigillifer*, are of exceptional interest from the point of view of geographical distribution. We are now in a position to confirm the views of Dr. S. L. Hora regarding the origin and distribution of fresh-water fishes and the close affinity between the fish fauna of Cochinchina, Siam, Burma and Eastern Himalayas and South India.


Elevation 4,000 to 5,000 feet above sea level. Fast flowing streams with rocky bed.

1. *Danio strigillifer* (Myers).

II. *Stream near Mahal on the Bababudan Hills*. 29. V. 1938.

Hill-stream with gravelly bed.

1. *Nemachilus striatus* (Day).
2. *Bhavania annandalei* (Hora).


Tank with clay bottom. Vegetation absent.

2. *Barbus stigma* (C. and V.).
4. *Rasbora buchanani* (Ham.).
5. *Ophicephalus punctatus* (Bloch).
IV. Hill-stream near Muttodi in the Jagger Valley. 1. VI. 1938.

Fast flowing stream with gravelly bed. In the course of the stream are shallow pools with sandy bottom where the water is fairly calm.

2. *Nemachilus striatus* (Day).

V. River Somavahini near Kesave. 1. VI. 1938.

Fast flowing river with gravelly bed.

1. *Barbus narayani* (Hora).
2. *Barbus melanampyx* (Day).

VI. River Bhadra near Hebbe. 2. VI. 1938.

Rapid current of water over boulders and also on fine sand.

2. *Garra jerdoni* (Day).
3. *Barbus tor* (Ham).
4. *Barbus narayani* (Hora).
5. *Barbus pulchellus* (Day).
15. *Mastacembelus armatus* (Lacep.).

VII. Tank near Narasimharajapur. 3. VI. 1938.

Tank full of vegetation.

2. *Barbus ticto* (Ham.).
3. *Barbus dorsalis* (Jerd.).
5. *Rasbora daniconius* (Ham.).
6. *Rasbora caverii* (Jerd.).  
7. *Esomus barbatus* (Jerd.).  
8. *Brachydanio rerio* (Ham.).

**VIII. River Tunga near Hariharpur. 4. VI. 1938.**

Rapid current over boulders and sand. During the course of the river are deep pools.

1. *Garra jerdoni* (Day).  
4. *Labeo nukta* (Sykes).  
5. *Cirrhina fulungee* (Sykes).  
7. *Barbus pulchellus* (Day).  
8. *Barbus pinnauratus* (Day).  
11. *Barbus dorsalis* (Jerd.).  
12. *Barbus sophore* (Ham.).  
13. *Rasbora daniconius* (Ham.).  
14. *Barilius barna* (Ham.).  
16. *Barilius vagra* (Ham.).  
17. *Danio strigillifer* (Myers).  
18. *Danio malabaricus* (Jerd.).  
19. *Labauca atpar* (Ham.).  
20. *Chela argentea* (Day).  

**IX. Tank near Koppa. 5. VI. 1938.**

Tank filled with vegetation.

2. *Garra jerdoni* (Day).  
4. *Barbus ticto* (Ham.).  
5. *Barbus amphibius* (C. and V.).  
7. *Rasbora daniconius* (Ham.).  
8. *Rasbora caverii* (Jerd.).  
9. *Barilius canarensis* (Herd.).
X. Hill-streams and River Hemavati at Kottigehar. 7. VI. 1938.

With gravelly and sandy bed. Vegetation absent.

1. Nemachilus striatus (Day).
2. Bhavania annandalei (Hora).
3. Barbus ticto (Ham.).
4. Barbus melanamyx (Day).
5. Barbus puckelli (Day).
6. Brachydanio rerio (Ham.).

XI. Ayyanakere Tank near Sakrepatna. 9. VI. 1938.

Extensive tank without any vegetation.

1. Callichrous bimaculatus (Bloch.).
2. Mystus cavasius (Ham.).
3. Nemachilus botia var. aureus (Day).
4. Cirrhina fulungee (Sykes).
5. Barbus pleurotaenius (Bleeker).
7. Barbus narayani (Hora).
8. Barbus ticto (Ham.).
9. Rasbora daniconius (Ham.).
10. Rasbora caverii (Herd.).
11. Amblypharyngodon melettinus (C. and V.).
14. Ambassis ranga (Ham.).
15. Mastacembelus armatus (Lacep.).
16. Ophicephalus marulius (Ham.).

_Silurus cochinchinensis_ (C. and V.)


There are seven specimens of *Silurus cochinchinensis* (C. and V.) in our collection measuring from 85 to 112 mm. in standard length collected from a shallow pit in the course of a hill-stream near Muttodi in Jagger Valley. These forms are of importance from the taxonomic and zoo-geographical points of view. Day described a species of *Silurus* which he termed as _S. punctatus_ in 1868 from a stream in Wynnaad 3,000 feet above sea level. Later he changed its name to _S. wynaadensis_. The adult specimens in our collection agree with _S. cochinchinensis_ but the smaller ones which are undoubtedly the young ones of the same species exhibit variation in the number of mandibular barbels.
<table>
<thead>
<tr>
<th>Number of specimens</th>
<th>Length of the fish</th>
<th>Number of mandibular barbels</th>
</tr>
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<tbody>
<tr>
<td>2</td>
<td>76 and 85</td>
<td>Two pairs of mandibular barbels.</td>
</tr>
<tr>
<td>2</td>
<td>78 and 86</td>
<td>The front pair of mandibulars present but of the hinder pair only one on the right side present. The left one has been absorbed.</td>
</tr>
<tr>
<td>3</td>
<td>86, 105 and 112</td>
<td>Single pair of mandibular barbels.</td>
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</tbody>
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Outline drawings of the growth-stages of *Silurus cochinchenensis* (C. & V.) showing the gradual disappearance of the hinder pair of mandibular barbels. Nat. Size.

1. Maxillary barbel. 2. Anterior mandibular barbel. 3. Posterior or hinder mandibular barbel.

It is evident from the above that the young ones possess two pairs of mandibular barbels and as they grow older the hinder pair is absorbed perhaps in the same way as the amphibian tadpole tail. The transitional condition is seen in the two specimens which possess only one of the hinder pair of mandibular barbels. The specimen measuring 105 mm. is an adult one since the ovaries are fully developed and contain mature ova. In all the specimens in our collection there are two oval patches of vomerine teeth divided by a short interspace.

This observation on the variability of the number of barbels in the same species has considerable taxonomic importance because Bleeker separates *Parasilurus* from *Silurus* mainly on the number of barbels (four mandibular barbels in *Silurus* and two in *Parasilurus*). Dr. Hora has examined both *Silurus* and *Parasilurus* and is of opinion that there is not any difference of generic value between the two forms except in the number of mandibular
barbels. We wish to point out here that while there is variability in the number of barbels among the individuals of the same species there is hardly any justification to separate a distinct genus *Parasilurus* from *Silurus* based entirely on this character. Dr. Hora has rightly refrained from attaching much importance to this character in classifying Indian siluroid fishes. Further Kimura⁹ records the observation of Atoda on the variability of number of barbels in *Parasilurus*—"The larvae have three pairs of barbels, but in its course of growth, one pair of barbels of the lower jaw vanish."

To us it would appear that Day’s separation of *S. wynaadensis* from *S. cochinchinensis* depends on two characters—the relation of the anal to the caudal fin and the number of mandibular barbels. In *S. wynaadensis* the anal fin is divided from the rounded caudal by a notch while in *S. cochinchinensis* the anal is slightly joined to the rounded caudal (Day). But according to Gunther’s description of *S. cochinchinensis* the anal and caudal fins are close together but separate. In all our specimens the anal appears to be very slightly joined to the caudal fin. Then regarding the number of mandibular barbels *S. wynaadensis* has two pairs while *S. cochinchinensis* has a single pair.

The separation of *S. wynaadensis* appears to depend almost entirely on the number of mandibular barbels. Now that we have pointed out the disappearance of a pair of barbels during development we have merely to regard *S. wynaadensis* as young individuals of *S. cochinchinensis* or that owing to some reason the two pairs of barbels persist in, some localities, even in adults. Under these circumstances the retention of *S. wynaadensis* becomes no longer valid. Hora has already pointed out that *S. afghana* is synonymous with *S. cochinchinensis*. Now from what has been said above it is evident that *S. wynaadensis* is also a synonym of *S. cochinchinensis*. Then finally it reduces itself that in India there is only one species of *Silurus*—*S. cochinchinensis*, which has a wide distribution in Eastern Himalayas, Assam, Burma and S. India.

After examining our specimens Dr. Hora remarks in a personal communication as follows: "The dorsal fin is better developed than in the specimens from the Eastern and Assam Himalayas. The vomerine teeth are arranged in two small patches which are distinctly separate from each other. The anal fin is slightly united with the caudal but is not completely confluent. Though in Prof. Rau’s specimens two pairs of mandibular barbels are present only in specimens up to 85 mm. in standard length, the specimens of *S. wynaadensis* Day in the collection of the Indian Museum ranging from 94 to 120 mm. in standard length possess two pairs of barbels."
From the above it seems probable that in South India we possess some representatives of the primitive stock of *S. cochinchinensis* that migrated from north-east towards south-west. In view of the material collected by Mr. Bhimachar *S. wynaadensis* is to be regarded as a synonym of *S. cochinchinensis*.

**Nemachilus striatus (Day)**


Large number of adult specimens have been collected from hill-streams in the Jagger valley and streams at Kottigehar. On a former occasion we had sent ten of these specimens from Kottigehar to Dr. S. L. Hora who has described them as young ones of *N. striatus* pointing out certain differences between these forms and Day’s *N. striatus*. Though we have pointed out that our specimens are adults and that they differ considerably from *N. striatus* Dr. Hora contends “unless the type specimen of *N. striatus* is carefully re-examined for these characters it would seem desirable to refer them to *N. striatus*”.

**Garra bicornuta (Rao)**


Specimens of this species from river Tunga collected both at Shimoga and Harilharpur conform to the description of Prof. C. R. Narayan Rao excepting in the nature of barbels. Prof. Rao states: “The anterior barbels are nearly twice as long as the posterior ones.” In all the specimens that we have examined there is only a short pair of rostral barbels and the maxillaries are completely absent. Dr. Hora says: “I have examined the syn-types of the species deposited in the Museum collection by Prof. C. R. Narayan Rao and find that the maxillary barbels are absent in all except one in which one small barbel on the right side could be made out.” This shows that the maxillary barbels have disappeared in *Garra bicornuta* as the hinder pair of mandibular barbels in *Silurus cochinchinensis*, which is distinctly an advanced character.

**Barbus narayani (Hora)**


Dr. S. L. Hora has recently described *Barbus narayani* from two adult specimens from the river Cauveri, Coorg State. We have collected large numbers of young and adult specimens of this species from Somavahini river at Kesave, Bhadra river at Hebbe, Ayyanakere tank and Koppa tank.
Our specimens agree with Dr. Hora’s description of the species except in
that they possess 19 rays in the caudal fin and in colouration. Dr. Hora
remarks that owing to long immersion in formalin the colour of the speci-
mens had disappeared. In our adult specimens there are five vertical black
bands, the first is immediately behind and above the operculum, second
extends below in front of the dorsal fin, the third is short extending through
only two scales below the commencement of the dorsal fin, the fourth
between the ventral and anal fins and the fifth is again a short band above
the anal fin. The scales have dark edges.

*Barbus jerdoni* (Day)


This fish like the *Barbus tor* grows to a huge size and is one of the
important food as well as game fish of Mysore. The reason for their rare
occurrence both in rivers and tanks is that most of them are caught before
they become adults. Adult forms growing to nearly 3 to 4 feet in length
could be seen in protected waters as in Stringer and Agraharc near Hariharpur.
Day states that this species occurs in rivers in Canara below the ghats and
attains at least 18 inches in length. Day has probably not come across
an adult since as we have stated above it is difficult to meet with adults
which are rare and are confined to deep parts of the rivers.

*Barbus melanampyx* (Day)


There are several individuals of this species in our collection. One
feature to which reference has not been made, is that there is a dark
band passing over the eye similar to the ones on the body. Both at Kesave
and Kottigehar these specimens have been noticed to move about in water
in pairs. The male is slightly smaller than the female. Whether this
behaviour is only seasonal is a matter which has to be investigated.

*Cirrhina fulungee* (Sykes)


While reporting on a small collection of fish from Chitaldrug District,
Mysore State, Dr. S. L. Hora observes “so far as I am aware, *Cirrhina
fulungee* (Sykes) is a very rare species in museum collections and its specific
limits are not properly defined”. We have in our collection a large number
of specimens of this species from river Tunga at Hariharpur and Ayyanakere
tank near Sakrepatna and they conform with the redescriptions of this species
by Dr. Hora.
Rasbora caverii (Sykes)


A large number of Rasbora caverii has been collected from Magadi tank near Chickmagalur. This species has recently been redescribed by Dr. Hora from specimens collected by Prof. C. R. Narayan Rao, from river Cauveri.

Danio strigillifer (Myers)


Myers described this species from two specimens collected at Myaing from Upper Burma. Later Hora has recorded its occurrence from three places in Shimoga District, Mysore State, and has pointed out that the occurrence of precisely the same species in such widely separated areas as Burma and S. India, is not without any significance. It is interesting to note that this fish occurs very commonly in Kadur District also. In several of the fast flowing streams in the Bababudan Hills (elevation 4,000 to 5,000 feet above sea level) the only fish that has been so far collected is Danio strigillifer.

Brachydanio rerio (Ham.)


Brachydanio rerio have been collected from Narasimharajapur tank and the streams at Kottigehar. They differ from the Burman form described by Prashad and Mukerji in the character of barbels and lateral line sense organ. While in the Burman form the maxillary barbels extend up to the middle of the pectorals and the rostrals twice as long as the diameter of the eye, in our specimens the maxillaries just reach the base of the pectorals and the rostrals are minute measuring about half the diameter of the eye. Prashad and Mukerji have given a table showing extreme variability of the lateral line sense organ in this species from ten different localities in Assam, United Provinces and Orissa. It is interesting to note that while the lateral line sense organ varies considerably in the Burman, Assam and United Provinces forms, it is completely absent in the Orissa and the South Indian forms.
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Typical streams on the Bababudan Hills
LITERATURE

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