CHAPTER III
SYSTEMATICS OF

Osteobrama bakeri (Day)
3.1. Introduction

The state of Kerala, situated on the South-West coast of India, with its varied geographical and climatic features, has been blessed with rich and diversified fisheries resources. The state abound with extensive inland water spread which are suitable for fish culture, extending over 3.61 lakhs ha, including backwaters (2.43 lakhs ha), reservoirs (0.30 lakh ha), tanks and ponds (0.03 lakh ha) and rivers (0.85 lakh ha) (FRMS, 2002). In spite of having immense scope and potential for the development of culture as well as capture fisheries in the state, the yield from these water bodies are far below optimal. However, with the increasing demand for fish as a source to cater the ever-increasing protein requirements of the human being and also to meet the emergency demands for the indigenous fishes in the ornamental fish trade industry in recent years, studies on freshwater fishes are gaining momentum in Kerala and other states of India. According to Kurup (2002), of the 170 species of fishes collected from the rivers and streams of Kerala, 66 species are food fishes and 104 species are having all the desirable qualities for propagating as ornamental fishes. The contribution of Kerala to the international fish trade is almost negligible at present when the turn out from the world ornamental fish trade is estimated to be approximately US$ 4.5 billion (Kurup, 1999; Ramachandran, 2002). With judicious tapping of the freshwater fishery resources, Kerala could become one of the leading states in India in ornamental fish trade, thereby generating employment opportunities and inter alia increasing export earnings considerably.
Sustainable utilisation of fishery resources calls for rational exploitation of the resources together with the implementation of appropriate conservation and rehabilitation programmes. A scientific database on resource characteristics and bionomics of fishes is indispensable for any programme designed for the management and conservation of fish species of commercial importance.

The fish species selected for the present study, *O. bakeri*, is an endemic species, belonging to the vulnerable category of threatened fishes. It is locally used as food fish and has all the desirable traits of an ornamental fish.

### 3.2. Description of the species

*O. bakeri* is a cyprinid fish, which is commonly known as Malabar Osteobrama and locally known as Mullanpaval or Mullanparal (Fig. 3.1).

**Systematic position**

<table>
<thead>
<tr>
<th>Taxonomic Level</th>
<th>Taxon</th>
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<tbody>
<tr>
<td>Phylum</td>
<td>Chordata</td>
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<tr>
<td>Sub-Phylum</td>
<td>Vertebrata</td>
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<td>Gnathostomata</td>
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<td>Grade</td>
<td>Pisces</td>
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<td>Class</td>
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<tr>
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</tr>
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<td>Genus</td>
<td><em>Osteobrama</em></td>
</tr>
<tr>
<td>Species</td>
<td><em>bakeri</em></td>
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</tbody>
</table>
An endemic species of Kerala, *O.bakeri* exhibits the following diagnostic characteristics.

D iii 8; A iii 12 – 13; P i 12 – 14; V i 10; C 20.

Trapezoid and compressed body with the abdominal edge rounded in front of pelvic fins and trenchant between bases of pelvic and anal fins. Mouth small, subterminal and protrusible; lips thin, lower lip adnate to lower jaw. Jaws moderate, teeth absent on jaws and palate. Pharyngeal teeth in 3 rows. Two small pairs of barbels. Dorsal spine weak and serrated posteriorly. Scales small; lateral line with 43–44 scales. Scale rows 5\(\frac{1}{2}\) between lateral line and pelvic fins. Predorsal scales 15.

Very attractive fish with silvery and iridescent body. Scarlet tinge on dorsal and anal fins. Highly compatible and peaceful in community tanks.

According to earlier reports, the anal fins of this fish possess only 11 branched rays and pectoral fins 12 rays (Day 1875-'78, Talwar and Jhingran, 1991; Jayaram, 1999). However, Shaji and Easa (2001) reported 13 anal fin rays in this species. In the present study, the presence of 12-13 rays in anal fin and 12-14 rays in pectoral fin was encountered. The fish attains a total length of about 110 mm (Talwar and Jhingran 1991; Menon, 1999). In contrast, males measuring a total
length of 150 mm and females of 163 mm could be collected during the present investigation.

*O. bakeri* is generally seen in the middle stretches of rivers, inhabiting the subsurface waters. They were present in shoals along the margin of rivers especially during the monsoon season. They were mainly collected from settlement areas with some crop fields. According to Biju *et al.* (2000), it prefers mud and sand as substrates. However, they also collected it from the moderate hilly areas of Chandragiri River where sand, gravel, cobble and boulders were present as main substrates.

3.3. Earlier reports

A perusal of available literature revealed that genus *Osteobrama* was diagnosed and described by Heckel (1842).


The previous reports of *O. bakeri* are as follows:

The genus *Osteobrama* is represented by 7 species in India (Jayaram, 1999) viz., *O. bakeri* (Day), *O. belangeri* (Valenciennes), *O. bhimesis* Singh & Yazdani, *O. dayi* (Hora & Misra), *O. neilli* (Day), *O. vigorsii* (Sykes) and *O. cotio* represented by 3 subspecies, *O. cotio cotio* (Hamilton-Buchanan), *O. cotio cunma* (Day) and *O. cotio peninsularis* Silas. Only two species viz., *O. bakeri* and *O. cotio peninsularis* are recorded from the rivers of Kerala. *O. cotio peninsularis* is the commonest form of *Osteobrama* in Peninsular India (Talwar and Jhingran, 1991) but its first and the only record from Kerala is that of Biju *et al.* (1999) who collected the fish species from Aluva region of Periyar river. According to Shaji and Easa (2001), *O.bakeri, O.bhimesis, O.cotio peninsularis, O.dayi, O.neilli and O.vigorsii* are available in Indian waters. Among them, *O.bakeri* was considered as a rare endemic species of Kerala, known only from the streams of Kottayam, Thattekkad (Periyar Basin) and Chaliyar River. Talwar and Jhingran (1991) described 8 species of *Osteobrama* from India viz. *O.bakeri, O.belangeri, O.cotio cotio, O.cotio cunma, O.cotio peninsularis, O.dayi, O.neilli and O.vigorsii*. Except *O.dayi*, all the above seven species were reported by Menon (1999). Among them, *O.bakeri* was treated as a rare fish whose distribution is only known from Kerala. Other species reported so far include *O.brevipectoralis* (Tilak and Hussain, 1989. synonym: *O.belangeri* by Talwar and Jhingran, 1991 and Menon, 1999), *O.alfrediana* (Beavan, 1877. synonym: *O.cotio cunma* by Menon, 1999), *O.microlepis* (Blyth, 1860. synonym: *O.belangeri* by Menon, 1999) and *O.rapax* (Gunther, 1868. synonym: *O.vigorsii* by Menon, 1999).

Ever since the description of *O.bakeri* in 1873 by Day as Rohtee bakeri, virtually nothing has been added to our knowledge on this species.
other than the very few references came across in general surveys. This paucity of knowledge on this very rare species having immense ornamental potential, thus has prompted to undertake the present investigation on *O. bakeni* in order to unravel life history traits, resource characteristics and nutritive value of this species. During the period of study from June 2001 to May 2003, the following aspects were dealt with:-

1. Biochemical analysis to understand the nutritive value of fish.

2. Food and feeding habits to provide information on basic components of diet as well as season and size related variability in feeding behaviour.

3. Reproductive biology to observe the process of gametogenesis, spawning season, sex ratio, fecundity and other related aspects.

4. Length-weight relationship and condition factor to ascertain the relationship between length and weight and the general well being of the fish.

5. Age and growth to understand the age composition of the exploited stock, age at maturation and life span of the species.

6. Population dynamics to estimate mortality rates, exploitation ratio, exploitation rate, relative yield per recruit etc. so as to bring out the level at which the exploitation of the stock is undertaken and this knowledge is essential for its judicious exploitation and management.
Fig. 3.1. Osteobrama bakeri (Day)
Monospecies aquarium