

Three new species of fishes of the genera *Osteochilichthys*(Cyprinidae), *Travancoria* (Balitoridae) and *Horabagrus* (Bagridae) from the Chalakudy River, Kerala, India

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Abstract

Osteochilichthys longidorsalis, new species, is distinguished from all other species of the genus by having 10 branched dorsal rays and a markedly elongate last simple dorsal ray. *Travancoria elongata*, new species, differs from *T. jonesi* by its more slender body, a longer and more slender caudal peduncle and in having the lobes of the rostral cap between the rostral barbels present, but not developed into barbel-like projections. *Horabagrus nigricollaris*, new species, is distinguished from *H. brachysoma* by its colour pattern, having a black saddle-shaped bar extending across the dorsum from the humeral region of each side. *Homaloptera pillaii* is removed from the synonymy of *H. montana* and is considered a valid species.

Keywords: *Osteochilichthys*, *Travancoria*, *Horabagrus*, *Homaloptera*, Kerala, India.

Introduction

Pethiyagoda (1991) pointed out that a meaningful taxonomic assessment of the freshwater fishes of Sri Lanka could only be made in conjunction with a comparative study of the fish fauna of southern India. Kortmulder et al. (1990) had already made some preliminary comparative studies on endemism among the fishes of southwestern Sri Lanka and the west-flowing rivers of Kerala. It was evident from this study that a more detailed comparative analysis was necessary and justified. Based on their distributions and habitats in Sri Lanka, Pethiyagoda (1991: 20, 26) also speculated on the possibility of two cyprinids then thought to be endemic to Sri Lanka, *Horadandia atukorali* and *Puntius bimaculatus*, occurring also in India. Subsequently, Rema Devi & Menon (1992) and Menon & Rema Devi (1992) confirmed the presence of both these species in South India. Encouraged by these results, in 1992 and 1993, in collaboration with Indian aquarium fish exporters, we undertook a survey of the freshwater fishes of Kerala. This survey resulted in several new records and a few hitherto undescribed species of fishes. The three new species described here are all from a single locality, immediately downstream of Kanjirappally waterfall, approximately 26 km from Chalakudy on the Valparai road.

Material and methods

Methods for taking measurements follow Kottelat (1984a) for *Osteochilichthys* and Skelton & White (1990) for *Horabagrus* (except that anal rays have been counted from radiographs). For *Horabagrus*, the caudal fin length is measured from the caudal peduncle to the fork of the caudal fin; the total length of the

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caudal fin is measured from the caudal peduncle to the tip of the longer lobe of the caudal fin. For *Travancoria* the measurements follow Kottelat (1984b), except that head length is the lateral head length. Vertebral counts were made from radiographs and give the total number of vertebrae excluding those of the weberian apparatus. The examined material is preserved in the Australian Museum, Sydney (AMS); the Zoological Reference Collection, National University of Singapore (ZRC); the Zoological Survey of India, Calcutta (ZSI); the Zoological Survey of India, Southern Regional Station, Madras (ZSI-SRS); the collection of Maurice Kottelat (CMK); and the Wildlife Heritage Trust of Sri Lanka, Colombo (WHT).

Abbreviations: SL, standard length; HL, lateral head length; s.d., standard deviation.

Study area

Although every major west-flowing drainage of Kerala south of the Palghat gap ($8^{\circ}30' - 10^{\circ}40' N$) was sampled in the course of our surveys, the three new species described here were recorded only from the Chalakudy River (Fig. 1) downstream of the Kanjirappally waterfall. Sampling was done at two locations along the river, separated by a distance of ca. 4 km. Vettilappara (approximately 100 m above m.s.l.) is 26 km east of Chalakudy town, on the Chalakudy-Valparai Road. In this area, the Chalakudy River, which has a catchment of $1,704 \text{ km}^2$ and an average annual runoff of $1.2 \times 10^9 \text{ m}^3$, descends in a series of rapids towards the lowland plains of western Kerala (Nair, 1986). The river at this point is 60-80 m wide, the river bed comprising mainly large boulders. Several pools 2-5 m deep occur in the river around this area.

The base of Kanjirappally waterfall was sampled scantily, the conditions rendering collecting very difficult, and also for reasons of safety. A short distance upstream of this waterfall are the Vaizhal Falls. No sampling was done upstream of Kanjirappally however, as this is a forest reserve. The area on either side of the river downstream of Kanjirappally is heavily cultivated, primarily with rubber (*Hevea*).

The headwaters of the Chalakudy River are located in the Annamalai Hills, largely in Kerala and partly in Tamil Nadu, at elevations of ca. 500 m above mean sea level. There are several upstream impoundments of the river, the largest being the Sholayar Dam. It appears that these dams have contributed significantly to providing a continuous flow of water in the river, even during periods of drought. We noted that during the dry period (January-April), many of the west-flowing rivers of Kerala and almost all their headwater reaches tend to dry up almost completely, particularly in areas heavily planted with tea. The Chalakudy River has been fortunate in having large tracts of relatively undisturbed forest in much of its headwater catchment, and is in our view one of the most important aquatic habitats yet remaining in southern Kerala. It is also an example of how irrigation development (usually considered to have a negative impact) and effective forest conservation practice can have beneficial effects on an aquatic fauna, despite the existence of a significant subsistence fishery. The survival of this habitat despite the obvious pressures placed on forests by the growing demand for agricultural land is indeed a tribute to the forest conservation authorities concerned.



Figure 1. Type locality, the Chalakudy River at Vettillappara in April, 1992.

Observations during a two year period lead us to believe that although the known range of the three new species described here might be very restricted, given the existing conservation strategy adopted in the area, there appears to be no immediate threat to their survival. The whole fish community would, however, be seriously threatened by any significant modification of the forest cover.

Osteochilichthys longidorsalis, new species
(Figs. 2-5)

Holotype. ZRC 34503, 235 mm SL, India: Kerala: Chalakudy River, 26 km upstream of Chalakudy town, near Vettillappara, R. Pethiyagoda and K. Manamendra-Arachchi, 15 April 1993.

Paratypes. ZRC 34504-34506 (3 ex., 153.5-169.0 mm SL), same locality as holotype, R. Pethiyagoda & K. Manamendra-Arachchi, 24 April 1992. CMK 8755 (5 ex., 82.0-134.0 mm SL), base of Kanjirappally waterfall, R. Pethiyagoda & K. Manamendra-Arachchi, 19 April 1992. CMK 8768 (37 ex., 66.8-220 mm SL), same locality as holotype, R. Pethiyagoda, 26-27 April, 1993. CMK 9299 (3 ex., 106.9-110.2 mm SL), same locality as holotype, M. Kottelat & R. Pethiyagoda, 12 November 1992. CMK 9317 (10 ex., 97.5-133.1 mm SL), same locality as holotype, M. Kottelat & R. Pethiyagoda, 13 November 1993. AMS 34196-001 (2 ex., 127.2, 130.8 mm SL), same data as holotype. WHT 427 (5 ex., 103.1-131.0 mm SL), same data as holotype. ZSI-SRS uncat. (3 ex., 115.6-134.9 mm SL), same locality as holotype, K. Manamendra-Arachchi, 12 September 1993.



Figure 2. *Osteochilichthys longidorsalis*, living specimen, now CMK8768, 220 mm SL paratype.



Figure 3. *Osteochilichthys longidorsalis*, living specimen, now CMK 9317, 133.1 mm SL paratype.

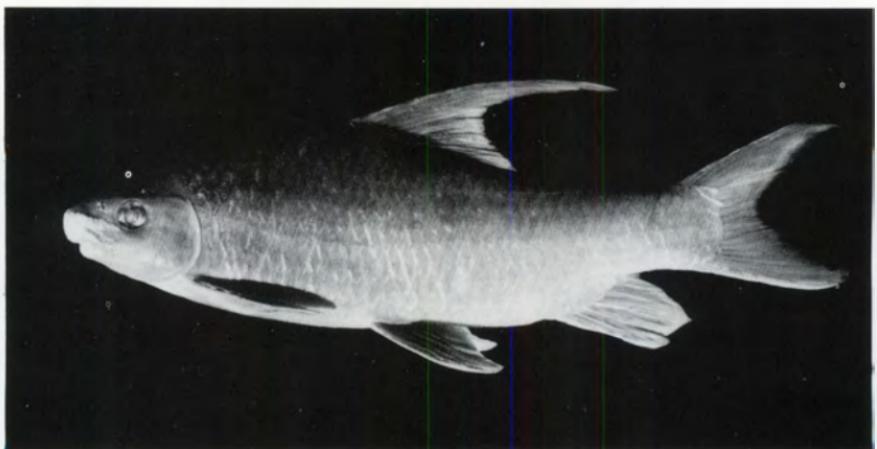


Figure 4. *Osteochilichthys longidorsalis*, holotype, ZRC 34503, 235 mm SL.

Table 1. *Osteochilichthys longidorsalis*, measurements of holotype (ZRC 34503) and 13 paratypes (ZRC 34504-34506, AMS 34196-001, WHT 427, ZSI-SRS uncat.), and syntypes of *O. nashii* (AMS B7693) and *O. thomassi* (AMS B7825). Total lengths are not given for the syntypes of *O. thomassi* and *O. nashii* as the caudal fins are damaged.

	Holotype	<i>O. longidorsalis</i>			<i>O. thomassi</i>	<i>O. nashii</i>
		Paratypes			Syntype	Syntype
		Range	Mean	s.d.		
Standard length	235.0	102.0-235.0			115.9	176.0
% of standard length						
Total length	126.8	126.8-138.1	132.9	3.1	-	-
Depth	33.2	29.2- 33.2	31.0	1.1	37.7	35.0
Depth of caudal peduncle	13.1	11.3- 13.1	12.0	0.5	13.8	13.8
Lateral head length	20.9	20.8- 25.3	22.4	1.1	26.1	22.3
Dorsal head length	20.7	20.7- 23.4	21.6	0.8	25.8	22.0
Maximum head width	16.8	14.2- 16.8	15.7	0.8	15.4	15.5
Maximum body width	18.5	16.0- 19.5	17.9	1.7	14.6	17.6
Pectoral fin length	23.5	22.7- 26.3	24.3	1.1	21.4	21.4
Pelvic fin length	23.2	23.1- 26.2	24.2	1.1	23.1	20.4
Dorsal fin length	46.6	24.1- 46.6	29.3	5.4	25.2	27.6
% of head length						
Snout length	42	37 - 45	41	2.1	34	41
Eye diameter	22	22 - 29	27	1.8	26	22
Interorbital distance	51	36 - 51	41	4.0	43	43
Internares distance	36	28 - 36	31	2.7	24	26

Diagnosis. *Osteochilichthys longidorsalis* is distinguished from the three other species in this genus by having 10 branched dorsal rays (vs. 11-15) and a markedly elongate last simple dorsal ray. Additionally, it is distinguished from *O. thomassi* by the absence of a dark lateral stripe (vs. present in juveniles), by having a shallower body (body depth 29.2-31.7% SL, vs. 35.3-39.2), and by not having a fimbriated upper lip (vs. fimbriated). *Osteochilichthys longidorsalis* differs from *O. nashii* by having a shallower body (body depth 29.2-31.7% SL, vs. 35), and by the absence of a dark blotch on the dorsal fin (Figs. 6-8).

Description. The general body shape and appearance is shown in Figures 2-4. Morphometric data of the holotype and 13 paratypes are given in Table 1.

Head and body compressed, belly slightly rounded. Eyes positioned somewhat superiorly, visible from dorsal and ventral aspects. Snout with tubercles on all specimens, the tubercles forming a patch in front of the eyes and about the level of their lower rim (Fig. 5). A few tubercles extend as far posteriorly as the anterior lower margin of the eye, but not on to the cheek. No tubercles elsewhere on the head or body. Nares placed slightly above and in front of middle of the eye. Mouth inferior, arched (when viewed from below). The upper lip is exposed in smaller specimens. In larger specimens (including holotype), the rostral fold overhangs the upper lip medially, the lip being exposed only laterally. Upper and

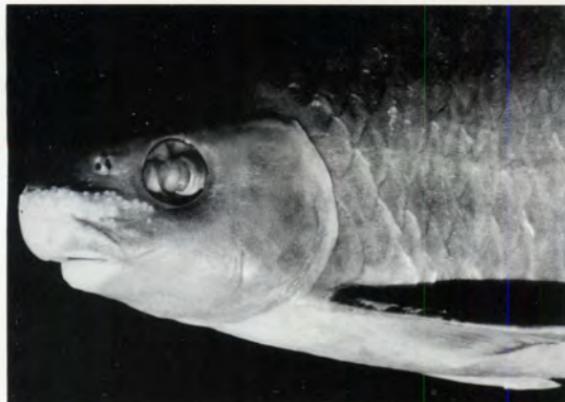


Figure 5. *Osteochilichthys longidorsalis*, holotype, ZRC 34503, 235 mm SL, showing distribution of tubercles.

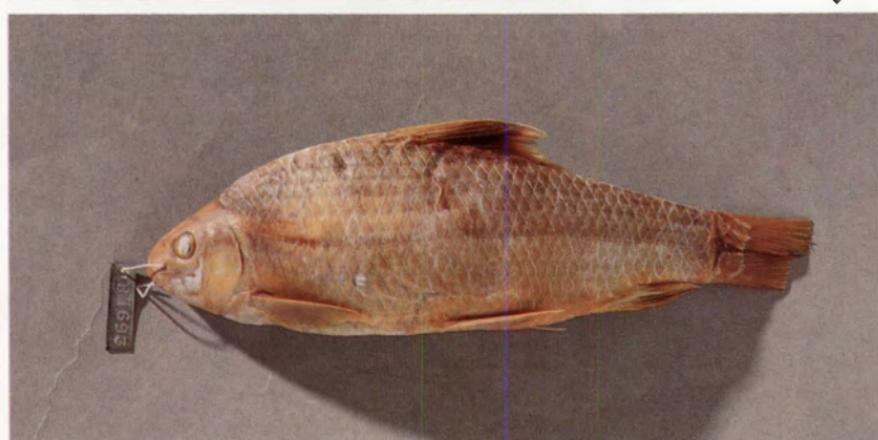


Figure 6. *Osteochilichthys nashii*, syntype, AMS B7693, 176.0 mm SL.



lower lips meet in a shallow groove. Lower jaw exposed in the form of a wedge-shaped edge, sharper in smaller specimens and more blunt in larger specimens (the sagittal profile is almost rounded in the holotype). The lower lip is adnate with the jaw, clearly behind it. Barbels absent.

Dorsal fin origin above 15th scale of lateral line, closer to tip of snout than to caudal base, with 4 simple and 10 branched rays, the last one branched to the base. The last simple ray is the longest, longer in adults than in juveniles (3.9 times as long as the last branched ray in the 235 mm SL holotype, see Fig. 4). With the fin adpressed on to the back, the tip of the last simple dorsal ray reaches beyond all the others even in the smallest specimens.

Anal fin with 3 simple and 5 branched rays, last one branched to the base. In specimens less than about 135 mm SL the first branched ray is the longest, the fin being pointed and with a distal margin that is concave. In larger specimens the third branched ray is longest, the distal margin of the fin being rounded (convex). Pectoral fin with 1 simple and 13 branched rays. Pelvic fin with 1 simple and 8 branched rays. All the fins, especially the pectoral and pelvic, thick and fleshy. Caudal fin with 9+8 branched rays. Vertebrae 35 (2) or 36 (2).

Lateral line complete with 39 (2), 40 (10, including holotype) or 39 (2) scales, including two or three unperforated ones on the base of the caudal fin. Twelve

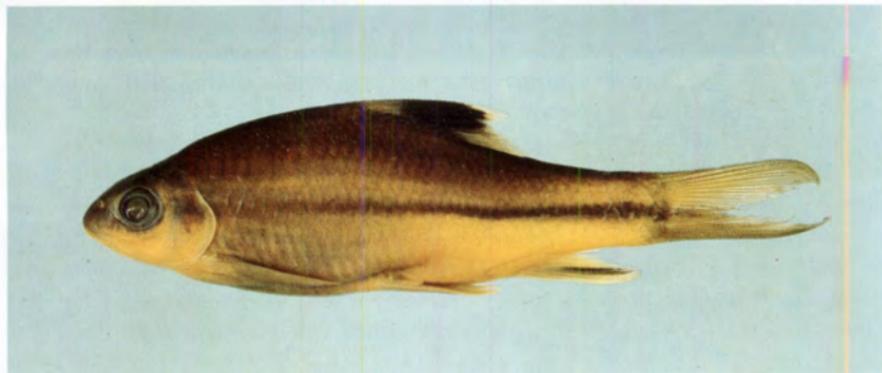


Figure 7. *Osteochilichthys nashii*, CMK 8863, 87.1 mm SL, Karnataka: Kumaradhara River.



Figure 8. *Osteochilichthys thomassi*, syntype, AMS B.7825, 115.9 mm SL.

predorsal scales. Transverse scale count between dorsal fin origin and pelvic fin origin $\frac{1}{2}6+1+3\frac{1}{2}$. Two axillary pelvic scales.

Coloration. In life (see Figs. 2-3) overall greenish grey, almost black dorsally and lighter ventrally. Body without any distinct markings. Simple rays of all fins (except dorsal fin) whitish. Simple rays of dorsal fin lighter than branched rays behind them; the anterior branched rays dusky for most of their length, those following becoming gradually more hyaline (sometimes yellow or orange) and then transparent. Fin bases, including that of caudal, dusky. In alcohol the fish is overall grey, with the anterior fin rays lighter. Upper and lower branched caudal rays darker at their base.

Etymology. From the Latin *longus*, meaning long, and *dorsalis* meaning of the dorsum (dorsal fin): an allusion to the remarkably long dorsal fin. A noun in apposition.

Discussion. Hora (1942) created *Osteochilichthys* as a subgenus of *Osteochilus* Günther, 1868. Kottelat (1989) and Karnasuta (1993: 88) have commented that *Osteochilichthys* actually is conspicuously distinct from *Osteochilus*. Karnasuta

considered that *Osteochilichthys* belongs to the subfamily Barbinae while *Osteochilus* is a member of the subfamily Labeinae. *Osteochilichthys* is diagnosed by the following combination of characters: lower jaw with a sharp, trenchant edge; lower lip adnate to lower jaw, slightly papillated or smooth, not covering cutting edge of lower jaw; upper lip fimbriated or entire, adnate to upper jaw; rostral fold present, overhanging median part of upper lip in adults; snout covered by tubercles; barbels absent (see comment on *O. godavariensis*, below); last simple dorsal ray not ossified and not serrated; 10-11 branched dorsal rays.

Hora (1942) recognized only two species of *Osteochilichthys*: the type species *O. thomassi* (Day, 1877) (type locality Fraserpett R., Coorg District, Karnataka), and *O. nashii* (Day, 1868) (type locality South Canara – now southwestern Karnataka). Examination of syntypes of *O. nashii* and *O. thomassi* in AMS (see Diagnosis above, Figs. 6 and 8, and Table 1) confirms that *O. longidorsalis* is indeed a distinct species. Additionally, *O. longidorsalis* is found to have 35-36 vertebrae, vs. 31 in *O. thomassi* and 34 in *O. nashii*.

Osteochilus malabaricus Day, 1873, (type locality Vithry in Wynnaad, Kerala) has been considered by Day (1875-78: 552) to be an adult specimen of *O. nashii* and synonymized with that species. No types of *O. malabaricus* have survived (or been so labelled in the ZSI or AMS, or listed by Whitehead & Talwar, 1976), and Day's synonymy is tentatively accepted.

Osteochilichthys godavariensis Rao, 1977 (type locality: Kirkee Nalla, Chandkas, Nahar Distr., Maharashtra) is distinguished from all other species of *Osteochilichthys* by having 14-15 branched dorsal rays (vs. 10-11), two pairs of barbels (vs. no barbels), lower lip with "three rows of well-developed papillae," a dark blotch along lateral line above pectoral fin and one at caudal fin base. The characters presently recognised as diagnostic of the genus are not mentioned in the description or are not shown on the illustrations (Rao, 1977). A re-examination of the type material of this nominal species will probably show it to be a member of *Labeo*, *Cirrhinus* or a related genus.

The anal fin shape observed in *O. longidorsalis* could be suggestive of sexual dimorphism but appears to be determined by size (maturity?) and not sex. The largest specimen taken is the holotype, 235 mm SL.

Comparison material. All material from India. *Osteochilichthys nashii*: AMS B7693 syntype (176.0 mm SL), Fraserpett River, F. Day. CMK 8863 (2 ex., 88.6-87.1 mm SL), Karnataka: Kumaradhara River at Shiradi, donated by A.G.K. Menon, 3 January 1992. *Osteochilichthys thomassi*: AMS B.7825, syntype (115.9 mm SL), South Canara, F. Day.

Travancoria elongata, new species
(Figs. 9-12)

Holotype. ZRC 34507, 98.8 mm SL, India: Kerala: Chalakudy River, 26 km upstream of Chalakudy town, near Vettilappara, R. Pethiyagoda & K. Manamendra-Arachchi, 24 April 1992.

Paratypes. From same location as holotype: ZRC 34508, 34509 (2 ex., 79.3-114.3 mm SL); AMS I.34197-001 (2 ex., 86.5-88.2 mm SL); ZSI uncat. (2 ex., 96.0-110.2

mm SL); WHT 423 (3 ex., 96.5-110.0 mm SL), same data as holotype. CMK 10029 (11 ex., 43.7-112.8 mm SL), K. Manamendra-Arachchi, 15 September 1993. CMK 10797 (2 ex., 83.8-90.6 mm SL), M. Kottelat & R. Pethiyagoda, 13 November, 1992.

Diagnosis. *Travancoria elongata* is distinguished from its only congener, *T. jonesi* by having a more slender body (body depth 8.2-10.5% SL, vs. 12.6-14.7% (data for *T. jonesi* in part from Menon, 1987)), a longer and more slender caudal peduncle (depth 4.7-6.3 times in its length, vs. 2.6-3.4), and in having the lobes of the rostral cap between the rostral barbels present, but not developed into barbel-like projections.

Description. The general body shape and appearance is shown on Figs. 11-12. Morphometric data of holotype and six paratypes are given in Table 2.

Head and body strongly depressed. Head and abdomen ventrally flat. Head 1.7-1.9 times wider than deep (mean 1.8, s.d.= 0.04). Mouth inferior, small, arched; jaws covered by a horny sheath; upper lip uninterrupted, fleshy, smooth, continuous around corners of mouth and extending slightly along lower jaw; lower lip not continuous with upper lip, restricted to a medial pad barely covering lower jaw and followed posteriorly by two prominent, fleshy, antrorse papillae; barbels three pairs; two short, fleshy and strongly papillated rostral barbels barely reaching upper jaw, and a similar maxillary pair at the angle of the

Table 2. Morphometric data of holotype (ZRC 34507) and six paratypes (ZRC 34508, 34509; WHT 0423) of *Travancoria elongata* and holotype of *T. jonesi* (ZSI F13507/1, caudal fin damaged).

	<i>T. elongata</i>			<i>T. jonesi</i>	
	Holotype	Paratypes		Holotype	
		Range	Mean	s.d.	
Standard length (mm)	98.8	79.4 - 114.3	-	-	60.7
% standard length					
Total length	123.0	122.1 - 124.8	123.7	0.4	-
Head length	16.0	16.0 - 16.4	16.2	0.1	18.5
Maximum width of head	12.8	12.2 - 12.8	12.5	0.1	11.5
Maximum depth of head	7.1	6.6 - 7.8	7.2	0.2	10.4
Head width at nares	9.2	8.7 - 9.5	9.0	0.1	11.0
Inter-orbital width	5.7	5.2 - 6.0	5.5	0.1	6.8
Snouth length	9.8	9.7 - 10.2	10.0	0.1	10.4
Eye diameter	2.9	2.8 - 3.0	2.9	0.1	4.5
Body depth (at dorsal origin)	9.9	8.2 - 10.5	9.1	0.3	13.0
Body width at anal origin	6.9	6.4 - 7.9	6.8	-	7.1
Body width at pelvic origin	13.5	13.4 - 15.0	14.2	0.2	15.0
Perdorsal length	40.1	40.1 - 43.4	41.7	0.4	47.0
Pre-anal length	70.3	68.0 - 72.6	70.0	0.7	75.0
Depth of caudal peduncle	4.4	3.8 - 4.5	4.0	0.1	6.1
Length of caudal peduncle	22.5	22.2 - 24.1	22.8	0.4	15.8

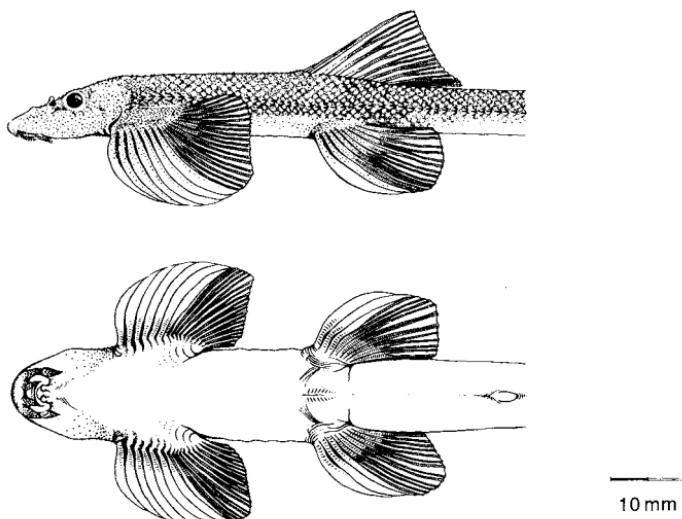


Figure 9. Lateral and ventral aspects of *Travancoria elongata*, paratype, WHT 423, 110.0 mm SL.

mouth; rostral cap with three inconspicuous lobes, separated from upper lip by a deep groove; gill openings extend to ventral surface of head for a short distance. Nares placed close to eye, separated from it by $\frac{1}{2}$ eye diameter. Snout dorsally flat, long, somewhat pointed.

Dorsal fin with three simple and 7 (1) or 8 (6) branched rays, the last one branched to the base. Pectoral fin large, inserted horizontally, with 7 strong, flattened, simple rays and 10 branched rays. Pelvic fin large, inserted horizontally, with 2 strong, flattened simple rays and 7 branched rays. Anterior 7-9 pectoral and 4-5 pelvic rays with adhesive pads on the distal parts of their ventral sides. Anal fin short, with three simple and five branched rays, the last one branched to the base. Caudal fin long, deeply forked, the lower lobe longer than the upper one, with 10+9 principal rays; 5-7 uppermost and lowermost principal caudal rays placed very close together, with no interradial membranes between them for most of their length.

Lateral line complete with 74 (1), 75 (2), 76 (1) or 77 (3) scales. Counted diagonally forwards, eight rows of scales between pelvic origin and lateral line, 9-10 rows of scales between lateral line and dorsal origin. Ventral surface anterior to anal fin scaleless; body scales not ordered in uniform rows, somewhat randomly placed. 32 vertebrae (1 ex.).

Body flattened, depth 8.2-9.4% SL, 10.8% SL for the smallest (43.7 mm SL) specimen. Caudal peduncle 6.3 times as long as deep for the largest specimen (114.3 mm SL), proportionately reducing to 4.7 times as long as deep for the smallest specimen (mean for series referred to in Table 2: 5.7, s.d. 0.2).

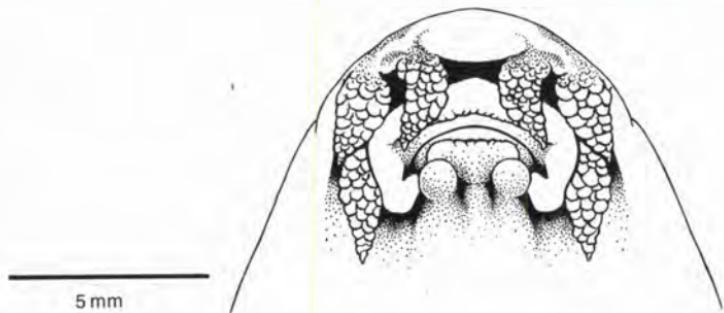


Figure 10. Ventral view of head of *Travancoria elongata*, paratype, WHT 423, 110.0 mm SL.

Head, except for rostrum, dotted with small, widely-spaced tubercles. Tubercles absent from ventral surface of head except for a small patch extending down the opercular flap. A small patch of minute tubercles also present on pectoral and pelvic fin bases, extending a short distance on to the fins along the dorsal surface of the rays. Three indistinct rows of more or less obscure tubercles extend from the head, along the dorsum, to dorsal origin. No tubercles on body posterior to pelvic fins.

Coloration. Body colour in life (see Fig. 11) greenish-brown, with dark brown spots, as large as or larger than eye, arranged in three rows: the largest spots arranged in a row along the back, three between occiput and dorsal origin (two sometimes coalesced into a single elongate blotch on dorsal base), seven between dorsal and caudal fin; a row of smaller spots, less distinct, centered more or less on the lateral line along each side; a row of 18-19 eye-sized spots along the lower margin of the flank, between pectoral and caudal, the anteriormost ones sometimes coalescing; fins similarly dotted on each ray, giving the appearance of transverse bars, the pectoral with five series, the pelvic with four series, the dorsal and anal each with two, the lower caudal lobe with six and the upper caudal lobe with three or four. This colour pattern is more evident in the smaller specimens, the blotches being more coalesced in the large specimens to give an uneven, mottled appearance. Ventral side creamy white. Ground colour of head a darker brown than body, mottled with several small, blackish spots.

Etymology. The feminine Latin adjective *elongata*, meaning elongate.

Discussion. Four genera and species of balitorine loaches have been recorded from Peninsular India: *Balitora mysorensis* (Hora, 1941) from southern Karnataka; *Homaloptera montana* Herre, 1945 from the Annamalai hills near the Tamil Nadu-Kerala border; *H. pillaii* Indra & Remadevi, 1981, from Silent Valley, Kerala; *Bhavania australis* (Jerdon, 1848) from the Western Ghats of Karnataka and southwards; *Travancoria jonesi* Hora, 1941 from Pampadampara near Pirmed, Kerala (Periyar River basin). All these fishes are associated with hill streams



Figure 11. *Travancoria elongata* paratype, CMK 10797, 90.6 mm SL.

descending from the Western Ghats of Karnataka and Kerala, southwestern India. The only other Indian balitorine species, *Balitora brucei* Gray, 1830, is restricted to the Ganges basin (Kottelat, 1988).

Bhavania Hora, 1920 is distinguished from the other three genera by its gill openings being small, restricted to the sides of the body above the pectoral base, and not extending to the ventral surface. *Bhavania* and *Travancoria* share the shape of the lips and the presence of a pair of conspicuous postlabial papillae, apparently unique in the family and probably evidence of their close phylogenetic relationship.

Travancoria, as originally described by Hora (1941), differs from Indian species of *Balitora* (which now includes several Chinese and Indochinese species; Kottelat, 1988; Kottelat & Chu, 1988) primarily in having the lower lip interrupted, the median part separated from the lateral parts and with two antrose papillae (the upper lip extends along the corner of the mouth and along the lower jaw, the lower lip being restricted to a central pad along the lower jaw); 6 simple pectoral rays (vs. 8-10); 75-77 lateral line scales (vs. 61-66 in *Balitora*; Kottelat, 1988). One of the main diagnostic characters of *T. jonesi* recorded by Hora (1941) and Menon (1987) is the presence of "7 or more" rostral barbels. Actually as clear from Hora's (1941) figure (and also from his description, p. 230), there are only 4 barbels. The remaining so-called barbels are three lobes of the rostral cap. The hard rostral cap and these three lobes are a character tentatively used by Kottelat & Chu (1988) to define a balitorine lineage within the family Balitoridae. These lobes seem particularly well developed in *T. jonesi*, but in *T. elongata* they are not even as well developed as in species of *Balitora* (cf. Fig. 10 and 12c with figures in Kottelat, 1988).

Travancoria elongata differs from Indian *Balitora* in having no papillae on the upper lip (present in *Balitora*); the papillae behind the lower lip being similar to those of *B. australis* and *T. jonesi*; 7 simple pectoral rays (vs. 8-10 in *Balitora*); head length of 16.0-16.4% SL (vs. 19-25% in *Balitora*); 74-77 lateral line scales (vs. 61-65); a shorter snout (9.7-10.2% SL, vs. 11.2-17.6); and a maximum head width of 12.2-12.6% SL (vs. 15.3-20.5); data from material examined and Kottelat (1988).

We have not had an opportunity to examine material of the two other balitorine loaches known from Peninsular India. *Homaloptera montana* is described from Puthutam Estate in the Annamalai Hills. From the descriptions of

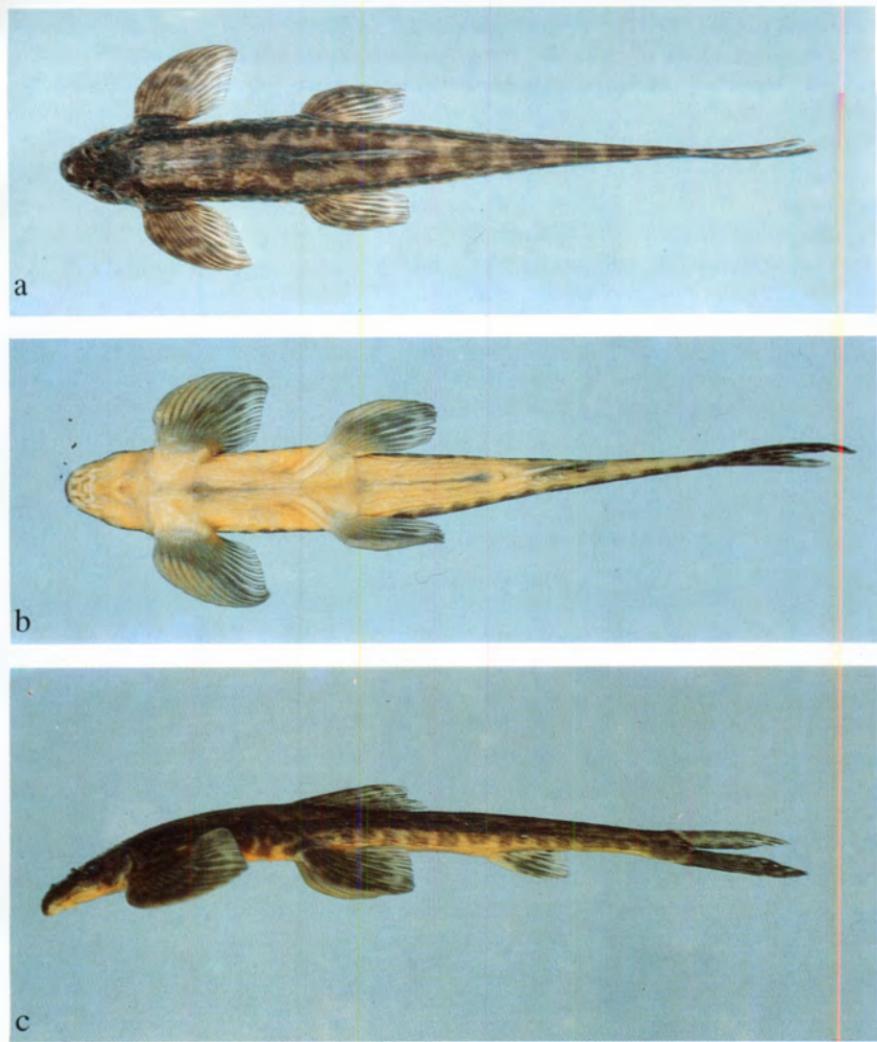


Figure 12. *Travancoria elongata* holotype, ZRC 34507, 98.8 mm SL.

Herre (1945) and Menon (1987: 226-228), *T. elongata* differs from *H. montana* by having (inter alia) 7 (vs. 4) simple pectoral rays and a body depth 8.2-10.5 times in SL (vs. 11.7-15.8 in *H. montana*). *Homaloptera* van Hasselt, 1823, sensu stricto, is distinguished from all South Indian balitorine genera by the absence of lobes of the rostral cap between the rostral barbels (the bases of which are contiguous). It differs from *Balitora* by the absence of labial papillae, and from *Travancoria* and *Bhavania* by the absence of postlabial papillae. It remains to be demonstrated that *H. montana* belongs to *Homaloptera*.

Menon (1987: 226) synonymised without discussion *Homaloptera pillaii* with *H. montana*. Indra & Remadevi (1981) distinguished *H. pillaii* from *H. montana* by various characters, about the accuracy of some of which we are doubtful (e.g. dorsal and anal fin ray counts), but also by others that separate clearly the two

species, such as the number of pectoral rays (7-9 simple and 11-13 branched rays, vs. 4 and 8 respectively, in *H. montana*), the number of branched pelvic rays (8-9, vs. 6-7) and the number of lateral line scales (83-93, vs. 72). The number of pelvic rays and the number of simple pectoral rays can easily be verified from the photograph accompanying Indra & Remadevi's description. Menon (1987: 226) based his redescription of *H. montana* only on Indra & Remadevi's (1981) material (and types) of *H. pillaii*, but while all his meristic data differ from Indra & Remadevi's data for the same specimens, they agree closely with Herre's (1945) data of the types of *H. montana* (which was not among the material examined by Menon). Menon does not comment on the differences he found between Indra & Remadevi's and his own counts. The illustration accompanying Menon's redescription is Herre's (1945) original illustration. We conclude that *H. pillaii* is obviously distinct from *H. montana* and the combined high lateral line scale counts and pectoral and pelvic ray counts of *H. pillaii* distinguish it from all other south Indian balitorines and homalopterines. It remains to be demonstrated that *H. pillaii* too, belongs to *Homaloptera*.

It is worth noting that the type locality of *Homaloptera montana* is Puthutam Estate, near Valparai in the Annamalai hills, in the drainage adjacent to and northeast of the Chalakudy basin.

Comparison material. All material from India, unless otherwise stated. Locality spelling for *Balitora* specimens are as they appear on the labels in the specimen jars; spelling in square brackets are ours. *Bhavania australis*: WHT 347 (22 ex., 59.3-94.8 mm SL); ZRC 34512-34517 (6 ex., 65.8-89.9 mm SL), Kerala: Vettilappara, approx. 26 km from Chalakudy on Chalakudy-Valparai road, R. Pethiyagoda & K. Manamendra-Arachchi, April 1992. *Travancoria jonesi*: ZSI F13507/1, holotype (60.7 mm SL), Kerala: Pampadampara, Pirmed. *Balitora brucei*: ZSI F11092/1 (1 ex., 83.3 mm SL), Hong-Piang stream, below Chemmapuruji [= Cherrapunji], Khasi Hills, Assam. *Balitora brucei mysorensis*: ZSI F686/2 (1 ex., 33.9 mm SL), Schimorsa [= Shimoga], Mysore. *Balitora brucei burmanica*: ZSI F656/2 (1 ex., 56.0 mm SL), Burma: Morbyit [= Mooleyit].

Horabagrus nigricollaris, new species (Fig. 13)

Holotype. AMS I.34198-001, 72.7 mm SL, India: Kerala: Chalakudy River, 26 km upstream of Chalakudy town, near Vettilappara, Pethiyagoda & K. Manamendra-Arachchi, 9 June 1993.

Paratypes. ZRC 34510, 34511 (2 ex., 74.8-130.2 mm SL); AMS I.34198-001 (2 ex., 111.6-125.8 mm SL); WHT 443 (2 ex., 110.8-173 mm SL); same location as holotype, K. Manamendra-Arachchi, 9 September 1993. ZSI-SRS uncat. (2 ex., 85.6-110.8 mm SL), R. Pethiyagoda & K. Manamendra-Arachchi, 9 June, 1993. CMK 8751 (3 ex., 118.2-170 mm SL), base of Kanjirappally waterfall, K. Manamendra-Arachchi & R. Pethiyagoda, 19 March 1993.

Diagnosis. *Horabagrus nigricollaris* is distinguished from its only congener, *H. brachysoma*, by the colour pattern: it has a black saddle-shaped bar extending across the dorsum from the humeral region of each side, vs. a black humeral ocellus edged in white in *H. brachysoma* (see Figs. 13-14). *Horabagrus nigricollaris* is also distinguished from *H. brachysoma* by having a shorter head (head length 25.1-27.7% SL, vs. 27.5-36.9), a larger eye (orbit diameter 24.2-28.0% HL, vs. 16.7-26.3), a broader pectoral girdle (width 81.0-85.7% HL, vs. 60.6-79.0), a longer dorsal spine (20.5-27.0% SL, vs. 15.7-20.3%) and a smaller distance between the dorsal origin and coracoid (21.4-24.6% SL, vs. 25.6-30.7). The caudal fin lobes of *H. nigricollaris* are shorter and more rounded than those of *H. brachysoma*. The two species also differ in the shape of the adipose fin (the dorsal profile of the adipose fin is continuous with the dorsal profile of the dorsum anterior to it in *H. nigricollaris*, vs. forms an angle with and is clearly elevated above the dorsal profile of the dorsum anterior to it in *H. brachysoma*; see Fig. 16).

Description. The general body shape and appearance are shown in Figure 13. Morphometric data for holotype and 11 paratypes of *H. nigricollaris*, and 12 ex. of *H. brachysoma* are given in Table 3.

Dorsal with a strong spine, with 12-16 serrae along its posterior margin, and five branched rays, the last one branched to the base. Anal with three simple rays and 23-26 branched rays, the last one branched to the base. Anal fin base long, 26.9-28.7% SL. Pectoral with a spine and 8 branched rays; pectoral spine serrated on both outer (9-11 serrae) and inner edges (13-17 serrae), the serrae on the outer edge being smaller than those on the inner edge. Pectoral fin does not reach pelvic fin base. Pelvic fin with one simple and 5 branched rays, reaching up to the anal fin origin. Caudal fin forked, lobes rounded and subequal, with 8+9 branched rays. Dorsal profile of adipose fin continuous with dorsal profile of dorsum.

Head depressed, broad, granulated, with a linear dorsal profile. Eye placed on the upper half of the head. Anterior naris separated from posterior one by $\frac{1}{2}$ orbit diameter. Snout length more or less equal to interorbital width. Mouth subterminal, crescentic. Occipital process distinct, extending to predorsal plate and a short distance under it (observed from radiograph). A single oval cephalic fontanelle, anteriorly narrow, not extending posteriorly beyond orbit.

Maxillary barbel extends well beyond base of pectoral fin. Outer mandibular barbel extends to base of pectoral; inner mandibular barbel much shorter, not reaching pectoral fin base. Nasal barbels extend almost to base of occipital process. Humeral process pointed, its length equal approximately to interorbital width. Ten branchiostegal rays (counted from a single stained specimen, WHT 443, 120.5 mm SL). Teeth villiform, finely set on jaws and palate (Fig. 16).

Coloration. In alcohol, head and body grey, darker dorsally, light yellow ventrally. A large, saddle-shaped black band extending from the humeral region of each side, over the nape, bordered in pale yellow. Pectoral and dorsal fins blackish grey. Caudal light yellow, the base and fin margins being dark, almost black. Anal greyish yellow, with a grey margin.

In life (Fig. 13), head and body grey-brown, darker dorsally. Belly white. A black saddle-shaped band, edged in white, extends from the humeral region of

Table 3. Morphometric data of *Horabagrus brachysoma* (WHT414; WHT 444) and *H. nigricollaris* holotype (AMS I.34198-001) and 11 paratypes (ZRC 34510, 34511; AMS I.34198-001; WHT 443; CMK 8779; ZSI-SRS uncat.).

	<i>H. brachysoma</i>			<i>H. nigricollaris</i>		
				Holotype and paratypes		Holotype
	Range	Mean	s.d.	Range	Mean	s.d.
Standard length (mm)	55.6 - 214			72.7 - 173		
% of standard length						
Total length	123.5 - 134	129.6	3.2	123.5 - 127.7	125.5	1.3
Head length	27.5 - 36.9	30.2	2.0	25.1 - 27.7	26.4	0.6
Predorsal length	36.5 - 42.1	39.7	1.5	35.3 - 38.4	36.3	0.8
Snout to pelvic base	52.0 - 59.1	54.6	1.8	48.0 - 54.0	51.6	1.5
Snout to anal origin	62.7 - 70.6	65.8	2.2	58.6 - 64.8	62.1	1.6
Length of caudal peduncle	7.3 - 13.0	11.1	1.7	10.7 - 13.1	12.3	0.7
Depth of caudal peduncle	9.9 - 12.2	11.0	0.6	11.3 - 12.8	12.0	0.4
Adipose to caudal peduncle	13.4 - 18.2	16.4	1.5	14.5 - 16.8	15.9	0.7
Dorsal to adipose	27.9 - 37.4	33.6	2.2	34.6 - 38.6	37.5	2.1
Adipose base length	4.8 - 7.8	6.2	0.9	5.1 - 12.1	9.3	2.3
Caudal total length	24.0 - 35.9	29.9	3.3	23.3 - 27.3	25.9	1.3
Caudal fin length	8.6 - 17.5	12.3	2.9	10.5 - 13.9	12.3	1.1
Dorsal spine length	15.7 - 20.3	18.1	1.0	13.2 - 16.9	14.9	1.1
Dorsal fin length	20.5 - 27.2	23.6	1.8	21.6 - 25.5	22.9	1.1
Dorsal to coracoid	25.6 - 30.7	28.2	1.3	21.5 - 24.6	23.6	0.8
% of head length						
Snout length	28.6 - 45.7	39.7	3.6	36.6 - 44.5	41.9	2.2
Orbit diameter	16.7 - 26.3	20.5	2.9	24.2 - 28.0	26.2	1.4
Interorbital width	31.7 - 47.1	39.0	3.4	39.5 - 47.1	42.7	2.8
Width of occipital process base	5.1 - 11.9	8.4	1.7	4.8 - 8.7	6.9	1.1
Coracoid to cranium	43.5 - 57.4	50.8	2.8	46.1 - 53.5	49.6	2.0
Humeral process length	33.0 - 45.2	41.0	3.0	42.0 - 47.3	44.8	2.1
Pectoral girdle width	60.6 - 79.0	74.5	4.0	81.0 - 86.8	83.3	1.8
Mouth width	47.0 - 61.3	54.4	3.5	54.9 - 63.4	58.8	2.5
Pectoral spine length	58.4 - 74.8	67.7	5.4	69.9 - 78.5	74.0	2.8

each side, over the back. Caudal fin light yellow, edged in black. Caudal base black. Pectoral and ventral fins light grey. Dorsal hyaline, dark at the base. Anal and caudal fins edged in black.

Etymology. From the Latin *niger*, meaning black, and *collaris*, meaning neck, collar. A reference to the dark saddle-shaped mark over the nape of the fish. A noun in apposition.

Discussion. *Horabagrus* was created by Jayaram (1955) for *Pseudobagrus brachysoma* Günther, 1864. This species has hitherto been placed in the family Bagridae but Mo's (1991:73) phylogenetic analysis concluded it actually is most closely related



Figure 13. *Horabagrus nigricollaris*, holotype, AMS I.34198-001, 72.7 mm SL, prior to fixation.



Figure 14. *Horabagrus brachysoma*, 158.4 mm SL, WHT 445; Kerala; Kottayam.

to *Pseudeutropius* and *Platytropius* (which is contradicted by one of his cladograms, p. 203). These two genera had earlier been placed in the family Schilbeidae, but according to Mo (1991: 196) this family is polyphyletic and at least some Asiatic genera (or possibly all: his text (p. 196) appears ambiguous) "are seemingly closer to the Bagridae or Pangasiidae." Awaiting clearer, unambiguous evidence on relationships, we conservatively consider *Horabagrus* as part of the family Bagridae.

Jayaram (1955, 1966) considered *Horabagrus* to be monotypic and considered *Pseudobagrus chryseus* Day, 1865 a synonym of *H. brachysoma*. We found the colour pattern of *H. brachysoma* to be the same in all specimens collected, regardless of size (55.6-214 mm SL), as is the case with *H. nigricollaris* (72.7-173 mm SL). We therefore exclude the possibility that *H. nigricollaris* represents a juvenile colour form of *H. brachysoma*. It is significant that we did not record *H. brachysoma* from any of the rivers sampled in Kerala, but only from estuarine habitats, despite having sampled all the major basins south of the Palghat Gap.



Figure 15. *Horabagrus brachysoma*, AMS B.7922, 169.0 mm SL, syntype of *Pseudobagrus chryseus*.

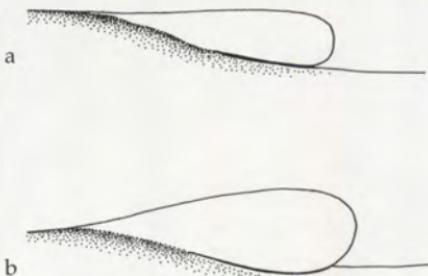


Figure 16. a, Adipose fin of *Horabagrus nigricollis* holotype, AMS I.34198-001, 72.7 mm SL; b, adipose fin of *H. brachysoma*, WHT 444, 92.8 mm SL.

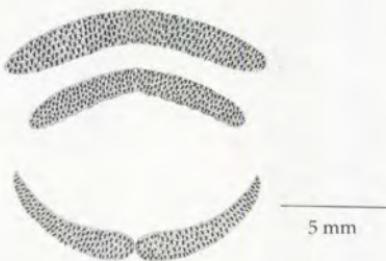


Figure 17. Dentition of *H. nigricollis*, paratype, WHT 443, 120.5 mm SL.

Günther (1864: 86) described the humeral ocellus of *H. brachysoma* as "A large black ocellus, edged with white." Day (1875-78: 443, pl. 99) described it as "A large, round black mark on the shoulder, surrounded by a light yellow ring." Information on and a photograph of the holotype of *Pseudobagrus brachysoma* Günther, 1864, provided by D. J. Siebert (in litt.) indicate that the colour pattern is in agreement with Day's figure. One of the syntypes of *P. chryseus* Day, 1865 which we have examined (AMS B.7922; Fig. 15), still obviously exhibits this colour pattern. We therefore agree with the synonymy of the two nominal species as proposed, among others, by Day (1875-78) and Jayaram (1952).

Horabagrus brachysoma was found to be abundant in the Vembanad Lake, a lagoon open to the sea that extends from Alleppey at the southern end to Kodungallur at the northern extremity ($9^{\circ}30' - 10^{\circ}15'$ N), where a gill net and basket-trap fishery exists for it. We have observed this species for sale in fish markets in Kottayam, Pallom and Ernakulam, all of which border Vembanad Lake. The water in this lake is brackish, but as several rivers including the Periyar and Pambiyar flow into it, there is a significant seasonal variation of salinity. According to fishermen associated with the fishery for *H. brachysoma*, the species is most abundant in the lake during periods of heavy rain (and hence reduced salinity). *Horabagrus brachysoma* may therefore be a fluviaatile species that descends to estuaries during periods of heavy rainfall. Day (1875-78) recorded the range of the species as "Rivers in Canara and Malabar," a region which includes all of present day Kerala and the southwestern part of Karnataka.

Comparison material. All from India. *Horabagrus brachysoma*: AMS B.7922 (1 ex., 169.0 mm SL), syntype of *Pseudobagrus chryseus*, Malabar, F. Day. WHT 444 (5 ex., 174-214 mm SL); CMK 9431 (5 ex., 143.0-194 mm SL), Kerala: Kottayam, M. Kottelat & R. Pethiyagoda, 19 November, 1992. WHT 445 (1 ex., 176 mm SL), Kerala: Kottayam, A. Pathirana, 9 June 1993. WHT 414 (7 ex., 55.6-101.8 mm SL), Kerala: Pallom, K. Manamendra-Arachchi, 08 June, 1993.

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