

A NEW SPECIES OF *CALLOGOBIUS* (FAMILY GOBIIDAE :  
PISCES) FROM GULF OF MANNAR, INDIA \*

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INTRODUCTION

THE genus *Callogobius* enjoys a wide distribution in the Indo-Pacific region. Koumans (1953) has recorded the following five species from the Indo-Australian Archipelago: *Callogobius centrolepis* M. Weber; *Callogobius hasseltii* (Bleeker); *Callogobius liolepis* (Bleeker) Koumans; *Callogobius sclateri* Steindachner and *Callogobius snelli* Koumans. Out of these only *Callogobius hasseltii* (Bleeker) was known to occur in Indian waters (Munro, 1955), the rest being confined to the Pacific ocean. Since then another species, *Callogobius seshaiyai* Jacob and Rangarajan has been recorded from India (Jacob and Rangarajan, 1959, 1960).

On 24-12-1961 three specimens of fish ranging in total length from 23.0 to 41.5 mm. were collected from Vedalai, Gulf of Mannar, South India (Lat. 9° 16' N., Long. 79° 08' E.) from a depth of about one metre. The presence of transverse as well as longitudinal papillated ridges on the head clearly assigns these specimens to the genus *Callogobius* Bleeker. A critical study reveals that although these specimens resemble closely *C. liolepis* than the other species of *Callogobius*, yet differ markedly from it in many important meristic and morphometric characters and as such are designated here as *Callogobius mannarensis* sp. nov.

Family GOBIIDAE

Genus *Callogobius* Bleeker

*Callogobius mannarensis* sp. nov.

D1. VI; D2. I. 9-10; A. I. 7-8; P. 15-17; V. I. 5; C. 17; Ll.  $\pm 35$ ; Ltr. 12; G.R. 1/8; Vertebrae 25.

Body elongate, anteriorly cylindrical, posteriorly compressed (Plate I; Fig. 1). Height of body at D1 origin 12.3-12.4% of standard length, 8.9-9.0% of total length; at D2 origin 13.8-14.2% of standard length, 10.0-10.3% of total length. Head depressed, longer than broad, width greater than height (Fig. 2). Length of head 25.2-25.8% of standard length, 18.5-18.7% of total length. Eye on top of head, looking sideways, diameter 13.1-13.2% of head length. Snout 2.4-2.5 times longer than eye, tip before eye. Bony interorbital nearly as broad as the diameter

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of the eye. Nostrils tubular, posterior slightly longer. Cleft of mouth oblique, posterior margin of maxilla stops far in front of eye in level with the vertical through the anterior nostril. Teeth uniserial near suspension and biserial at the sides of lower jaw (Figs. 5, 6). A third row of 4-5 enlarged teeth near symphysis (Fig. 7). Teeth at the sides of lower jaw slightly short, curved and bluntly pointed (Fig. 8). Teeth biserial in the upper jaw (Fig. 9), those near symphysis (Fig. 10) longer than the rest (Fig. 11). No teeth on vomer and palatine. Tongue free, rounded. A short curved mucous canal along the inner edge of each eye, inter-connected by a short horizontal branch at the level of the posterior border of eye, the ends of the canal terminating in pores, one anterior and another posterior to eye. Mucous canals absent on cheek and opercle. Scales thin, irregularly arranged, cycloid throughout (Fig. 4), covered by a thin granulous skin and not visible externally. In a specimen cleared and stained in Alizarin red, it is noticed that the entire dorsum before first dorsal, cheek, opercle, base of pectoral and breast naked. Belly, sides of body, dorsal and ventral side of the caudal peduncle covered with cycloid scales. About 35 scales from axil to caudal base. Scales anteriorly small, circular, posteriorly large and slightly elongated. 12 transversal lines of scales counted from the origin of the second dorsal fin downwards and 8 from the end of second dorsal fin downwards. Gill openings not continued forward and the isthmus broad. 8 short gill rakers along the lower limb of the left outer gill arch (Fig. 12). About 16 rows of cutaneous papillae on the sides from axil to caudal base, most of them arranged transversally, few longitudinally. The first dorsal connected to the base of second by a low, thin membrane. First dorsal fin obtuse, lower than height of body, fourth spine longest. Second dorsal higher than first, nearly as high as body, posteriorly pointed, eighth ray longest. Last rays of second dorsal and anal nearly reach the base of dorsal and ventral caudal lobes respectively. Ventral shorter than head, does not reach anal, extend a little beyond the vertical from the base of the last dorsal spine. Basal membrane fairly well developed, thin (Fig. 3). Pectoral longer than head, extend a little beyond the origin of second dorsal and when fully expanded hides the first dorsal completely. Caudal fin oblong, longer than head.

*Colour of live specimen:* Ground colour of body slightly pinkish. Four narrow brownish bands radiate from eye, one extending forward to snout, another to the operculum, third one towards occiput and the fourth from eye to eye. Anterior half of posterior tubular nostril brownish. In between the posterior nostrils a group of papillae on either side brownish. A few scattered brown spots over occiput. A broad brown band across the nape extending from the operculum of one side to the other, mid-dorsally very broad, the concave posterior border extending behind the vertical passing through the base of pectoral. A scarlet patch enclosed by dark margin on the pectoral fin near the base extending from the third to thirteenth ray. Few isolated scarlet spots on the middle of pectoral. Pearly white patches at the ventral base of pectoral and on the middle of the fin. A saddle-shaped brown patch across the dorsum in front of first dorsal. A broad posteriorly slanting scarlet band in the middle of first dorsal, the lower border extending upto or slightly below the mid-lateral line. Posteriorly the first dorsal bluish white, tip of fin transparent. An elongated brown patch on either side of body below the anterior third of second dorsal base. A wide posteriorly slanting scarlet band in the middle of second dorsal extending beyond the base of the anal fin. Posterior to this band the summit of second dorsal bluish white. An elongated brown patch on the dorsal side of caudal peduncle. A vertical brown band at the base of caudal fin with bluish white posterior border. A large scarlet patch over the caudal fin extending over three-fourths of the fin. Posteriorly the caudal fin bluish white

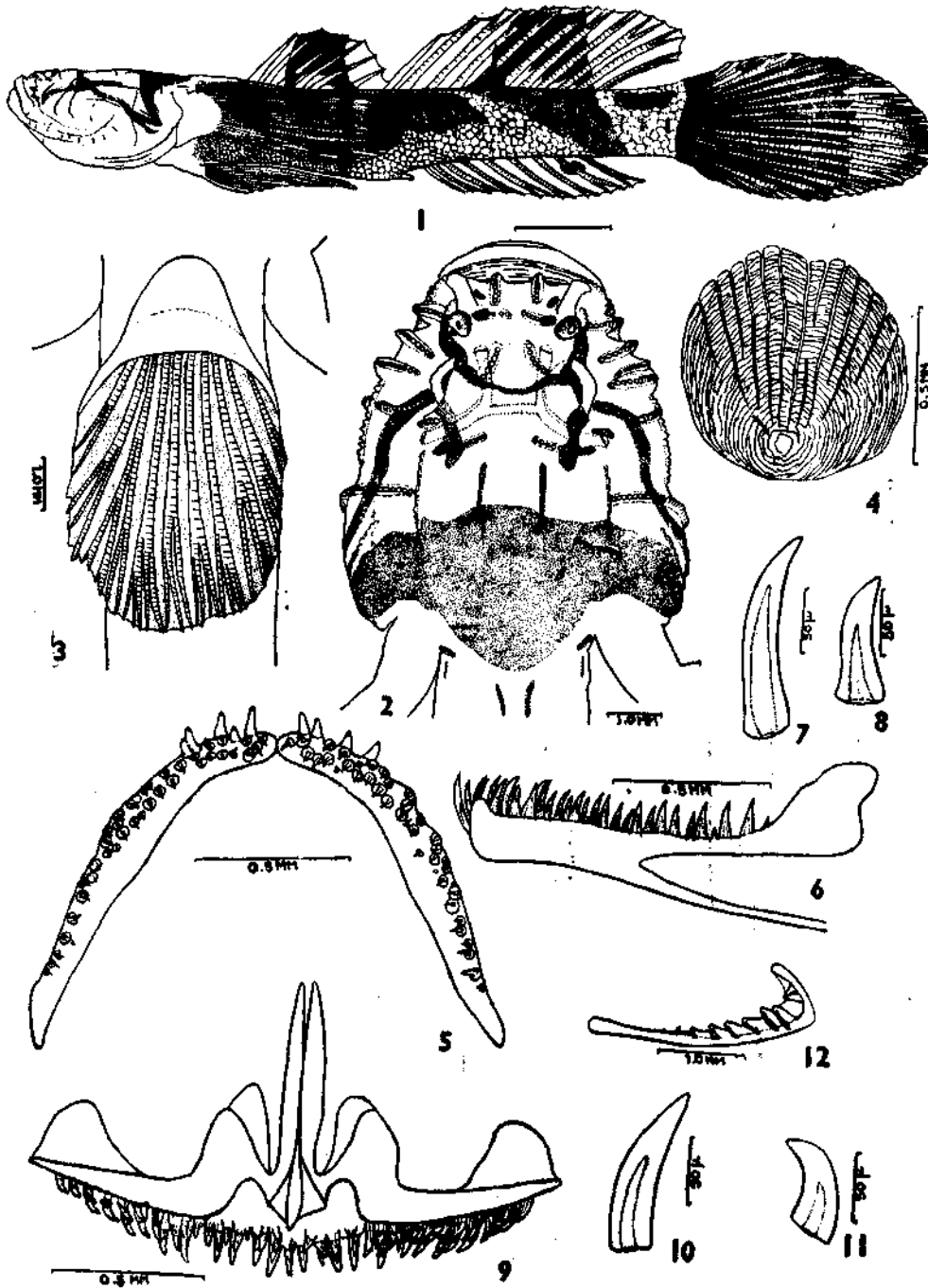


FIG. 1. Side view of *Callogobius mannarensis*. FIG. 2. Enlarged dorsal view of head. FIG. 3. Ventral fin with basal membrane. FIG. 4. Scale from the caudal peduncle. FIG. 5. Dorsal view of the lower jaw. FIG. 6. Side view of the lower jaw of the right side. FIG. 7. Enlarged tooth near symphysis of lower jaw. FIG. 8. Tooth from the side of lower jaw. FIG. 9. Ventral view of the upper jaw. FIG. 10. Tooth near symphysis of upper jaw. FIG. 11. Tooth from the side of upper jaw. FIG. 12. Outer gill arch of the left side.

- and the tip transparent. A few isolated brown patches on the anal fin and on the basal membrane of the ventral.

*Colour in formalin* : The bluish white colour over the dorsal fins and the caudal fin disappears. So also the pearly white patches at the base and middle of pectoral fin. Rest of colour are more or less permanent the scarlet patches tending to be brownish due to preservation.

The detailed precision measurements of the holotype and paratype, converted into thousandths of standard length are given in Table 1. The various measurements were taken under the low power of a binocular in combination with an ocular disc.

TABLE I

|                                   | Holotype | Paratype |
|-----------------------------------|----------|----------|
|                                   | mm.      | mm.      |
| 1. Standard length                | 28.3 mm. | 30.2 mm. |
| 2. Length of head                 | 258      | 252      |
| 3. Length of snout                | 86       | 78       |
| 4. Diameter of eye                | 34       | 33       |
| 5. Bony interorbital distance     | 33       | 32       |
| 6. Length of maxilla              | 62       | 63       |
| 7. Greatest width of head         | 216      | 215      |
| 8. Height of head                 | 157      | 161      |
| 9. Snout to D1 origin             | 345      | 336      |
| 10. Snout to D2 origin            | 545      | 534      |
| 11. Prepectoral distance          | 265      | 258      |
| 12. Preventral distance           | 283      | 285      |
| 13. Preanal distance              | 615      | 632      |
| 14. Length of pectoral fin        | 317      | 338      |
| 15. Length of ventral fin         | 215      | 223      |
| 16. Length of caudal fin          | 385      | 392      |
| 17. Depth at D1 origin            | 123      | 124      |
| 18. Depth at D2 origin            | 138      | 142      |
| 19. Height of caudal peduncle     | 108      | 109      |
| 20. Length of base of D1          | 191      | 188      |
| 21. Length of base of D2          | 302      | 293      |
| 22. Length of base of anal        | 191      | 186      |
| 23. Height of first dorsal        | 108      | 92       |
| 24. Height of second dorsal       | 138      | 121      |
| 25. Height of anal                | 68       | 69       |
| 26. Last dorsal ray to caudal fin | 129      | 134      |
| 27. Last anal ray to caudal fin   | 157      | 155      |
| 28. Length of anal papilla        | 28       | 29       |

The main characters of *Callogobius mannarensis* and the closely related *Callogobius liolepis* are summarized in Table 2. The different measurements for *C. liolepis* in the table are after Koumans (1953) and have been converted into thousandths of standard length for easy comparison.

#### DISCUSSION

The various species of *Callogobius* occurring in the Indo-Australian Archipelago have been classified into two major groups by Koumans (1953) based on the type of

scale found on various regions of the body. Out of the five species described by Koumans (*op. cit.*) only in *C. liolepis* the scales are cycloid throughout the body.

TABLE II

|                           | <i>Callogobius<br/>mannarensis</i> sp. nov.                    | <i>Callogobius<br/>liolepis</i> (Bleeker) Koumans |
|---------------------------|--|---|
| 1. First dorsal           | VI   | VI  |
| 2. Second dorsal          | I. 9-10  | I. 8-9  |
| 3. Anal                   | I. 7-8   | I. 8-9  |
| 4. Pectoral               | 15-17  | 21  |
| 5. Ll.                    | ± 35   | ± 45  |
| 6. Ltr.                   | 12   | 12  |
| 7. Predorsal scale        | Absent   | ± 17  |
| 8. Height of body         | At D1 123-124 S.L.<br>At D2 138-142 S.L.                       | 143-154 S.L.                                      |
| 9. Length of head         | 252-258 S.L.   | 286 S.L.  |
| 10. Diameter of eye       | 7.5-7.6 in head  | About 5 in head                                   |
| 11. Length of snout       | 2.4-2.5 times eye  | Longer than eye                                   |
| 12. Maxillary             | Stops far in front of eye                                      | Extends a little behind eye                       |
| 13. Teeth                 | In two rows. An outer enlarged row near symphysis of lower jaw | In several rows, outer row enlarged               |
| 14. Scales                | Cycloid throughout   | Cycloid throughout                                |
| 15. Head above behind eye | Naked  | Scaled  |
| 16. Cheek and opercle     | Naked  | Naked   |
| 17. Breast                | Naked  | Scaled  |
| 18. First dorsal fin      | Lower than body  | Lower than body                                   |
| 19. Second dorsal fin     | Higher than first dorsal                                       | Higher than first dorsal                          |
| 20. Anal fin              | Shorter than first dorsal                                      | Higher than first dorsal                          |
| 21. Pectoral fin          | 1.2-1.3 times head   | Nearly as long as head                            |
| 22. Ventral fin           | Shorter than head  | Shorter than head                                 |
| 23. Caudal fin            | Longer than head   | Shorter than head                                 |
| 24. Papillae on body      | About 16 transverse rows from axil to caudal base              | Absent  |

In the other four species (*C. centrolepis*, *C. hasseltii*, *C. sclateri* and *C. snelliusi*) the scales are cycloid anteriorly and ctenoid posteriorly. According to this classification, *C. seshaiyai* which was reported from Porto Novo, South India, by Jacob and Rangarajan (1959, 1960) falls into the latter group since in that species also the scales on the posterior region of the body are ctenoid. As will be seen from the above description *C. mannarensis* is very close to *C. liolepis* in the nature of the scales in body as well as the size of the bony interorbital. However, it differs markedly from *C. liolepis* in various morphometric measurements and meristic counts as shown in Table 2. *C. mannarensis* can easily be differentiated from *C. liolepis* by the slightly greater number of rays in second dorsal, lesser number of rays in pectoral, absence of predorsal scales, naked breast, greater height of body and length of head, much smaller eyes, maxilla which stops far in front of eye, greater length of pectoral and caudal and presence of number of transverse rows of papillae along the sides of the body. Moreover the colouration of *C. mannarensis* is also markedly different as shown in the description.

To accommodate *C. seshaiyai* as well as *C. mannarensis* a revised key for the identification of the Indo-Australian species of *Callogobius* is given below.

*Key to the Indo-Australian Species of Callogobius*

1. All scales of body cycloid. Cheek and opercle naked. Interorbital as broad as or a little narrower (5/6th) than eye.....2  
Scales posteriorly ctenoid, anteriorly cycloid. Cheek and opercle scaled. Interorbital much narrower (1/3rd) than eye.....3
2. Predorsal scales present. Head above behind eye and breast scaled. Maxillary extends a little behind eye. P. 21. Teeth in several rows....  
.....*C. liolepis*  
Predorsal scales absent. Head above behind eye and breast naked. Maxillary stops far in front of eye. P. 15-17. Teeth biserial.....  
.....*C. mannarensis*
3. 11-13 rays in second dorsal and anal fin.....*C. seshaiyai*  
10 or less rays in second dorsal and anal fin.....4
4. More than 40 scales along lateral line.....*C. hasseltii*  
Less than 40 scales along lateral line.....5
5. Basal membrane of ventral fin absent.....*C. sclateri*  
Basal membrane of ventral fin present.....6
6. 10-12 predorsal scales.....*C. centrolepis*  
8 predorsal scales.....*C. snelliusi*

The type specimens have been deposited in the museum of the Central Marine Fisheries Research Institute, Mandapam Camp, and are assigned the following numbers.

Holotype : CMFRI. No. 102. A specimen measuring 28.3 mm. in standard length.

Paratype : CMFRI. No. 103. A specimen measuring 30.2 mm. in standard length.

Type locality : Near Vedalai, Gulf of Mannar, South India, from a depth of about a metre, sandy bottom.

## SUMMARY

The paper describes a new species of fish belonging to the genus *Callogobius* Bleeker. Its systematic position in relation to the other known species of the genus from the Indo-Australian Archipelago has been discussed. A revised key has also been provided for the identification of the various species of *Callogobius* occurring in the Indo-Australian Archipelago.

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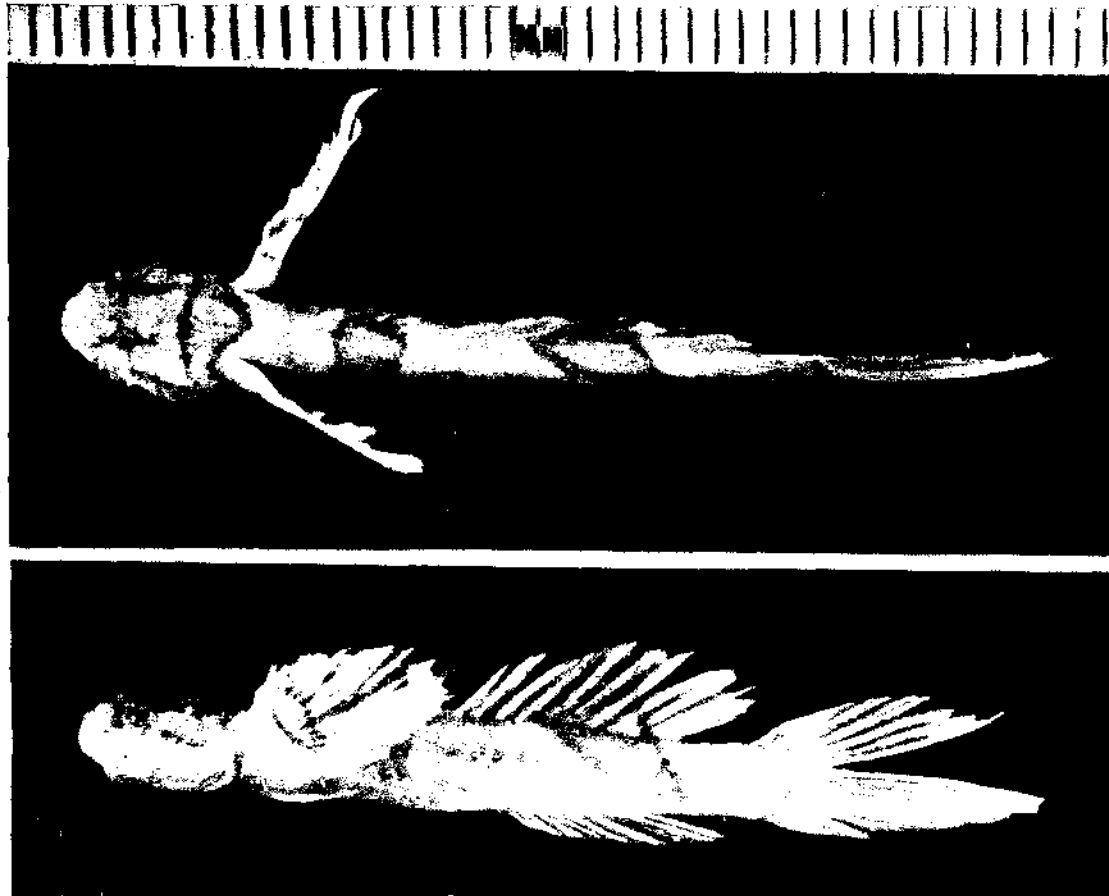


PLATE 1. Dorsal and side view of *Callogobius mannarensis*. Holotype.

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