

**A NEW SPECIES OF SILVERBELLY *LEIOGNATHUS STRIATUS*  
(FAMILY LEIOGNATHIDAE: PISCES) FROM THE GULF OF MANNAR, INDIA  
AND REDESCRIPTION OF *LEIOGNATHUS FASCIATUS* (LACÉPÈDE)**

P. S. B. R. JAMES AND M. BADRUDEEN\*  
Central Marine Fisheries Research Institute, Cochin-682 031

ABSTRACT

A new species of silverbelly *Leiognathus striatus* (Leiognathidae : Pisces) from the Gulf of Mannar is described and compared with *Leiognathus fasciatus* (Lacépède) and *Leiognathus smithursti* (Ramsay and Ogilby) with which the new species resembles. A redescription of *L. fasciatus* (Lacépède) is also given since the original description lacks in many details.

INTRODUCTION

FISHES of the family Leiognathidae form a well defined group and are widely distributed in the Indo-Pacific and contribute to significant fisheries in certain regions. These fishes are consumed in fresh, sundried and salt cured conditions. They are also an important source of fish meal.

From the seas around India, 20 species of this family have so far been reported (James, 1968, 1969, 1975; Rani Singh and Talwar, 1978 a, b; Jayabalan, 1985). James 1984 reviewed the fishes of the family Leiognathidae from the Western Indian Ocean, providing a key for their field identification. Sreenivasarengan *et al.* (MS) reported occurrence of *L. elongatus* from the seas around India.

During the course of the investigations on the biology of various species of this family and their fishery in the Palk Bay and Gulf of Mannar region from 1963 to 1981, the authors came across a number of specimens closely resembling *Leiognathus fasciatus* and somewhat distantly resembling *L. smithursti*.

At the same time, these specimens have been found to differ from the other two species strikingly in certain morphometric characters and colouration. Therefore, these specimens should be assigned to a new species of Leiognathidae. The new species is named *Leiognathus striatus* based on the distinct yellowish orange vertical bands (in fresh condition) which descend from the back and surpass both lateral line as well as the median line of the body and a prominent hump in the predorsal region of the body. The authors have been able to collect a large number of specimens of this new species from the Gulf of Mannar off Pamban, Mandapam and Kilakarai captured in trawl and gill nets at depths varying from 20 to 50 meters. A detail description of this species and its comparison with *L. fasciatus* and *L. smithursti* are given in this paper. A redescription of *L. fasciatus* is also given based on recent material, since the original description lacks many details.

The authors are grateful to Dr. M. L. Bauchot of the Museum National D' Historie Naturelle Paris for kindly making available information on *Clupea fasciata* described by Lacépède, original references to the species and other related information, which have been quoted in

\* Present address: Regional Centre of CMFRI, Marine Fisheries - P.O., Mandapam Camp, Tamil Nadu.

this paper. They also thank Mr. Almanikfan for translating the original French description of the species.

#### DESCRIPTION OF NEW SPECIES

*Lelognathus striatus* sp. nov. (Fig. 1, Plate I A)

##### Material

Holotype female 155 mm SL (200 TL). Allotype 105 mm SL (135 TL) and 14 Paratypes. 69 to 167 mm SL (89 to 220 TL) collected from the Gulf of Mannar at Pamban, Mandapam and Kilakarai. The specimens are deposited in the Museum of the Regional Centre of Central Marine Fisheries Research Institute, Mandapam Camp, under Reg. No. CMFRI F 98/682.

convexity opposite and in front of front border of eye and from there in a straight line upto a point opposite hind margin of eye from whence the dorsal profile shows a strong hump (steeply convex) upto origin of spinous dorsal fin. Height 1.30-1.84, head 2.76-3.13 in SL (1.69-2.64 and 3.55-4.04 in TL respectively) eye 2.75-3.85 in head. Inter-orbital space almost flat, bounded by two ridges which continue posteriorly as outer borders of nuchal spine which almost twice in head. Central portion of spine elevated; two small spines on top of head, one nearer the margin of eye being more prominent than the one away from margin of eye. Mouth, when protracted directed downwards, gape of mouth when closed opposite and above lower margin of eye, tip of maxilla

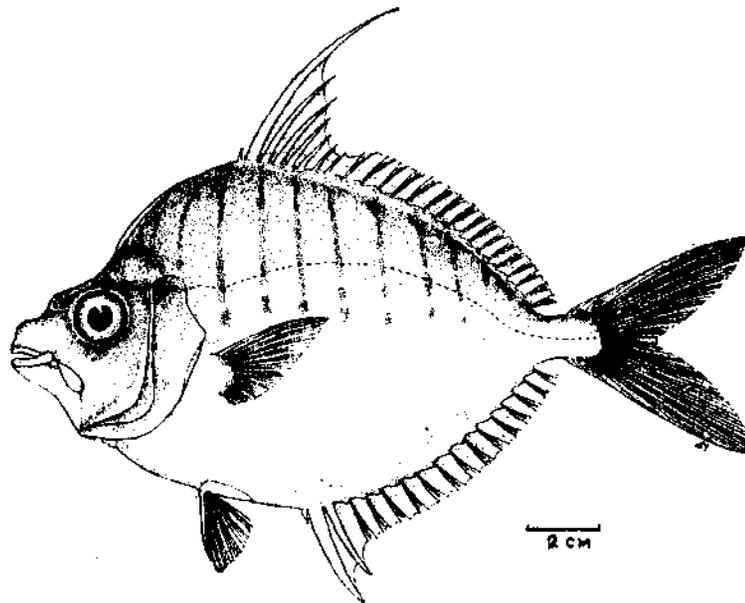


Fig. 1. *Lelognathus striatus* sp. nov.

##### Description

D VIII, 16; A III, 14; body compressed, dorsal profile more convex than ventral, from tip of snout the dorsal profile rises with a little

just surpassing front margin of eye. Lower margin of lower jaw strongly concave, preopercle with an obtuse angle, its lower margin finely serrated, teeth small, numerous; gill

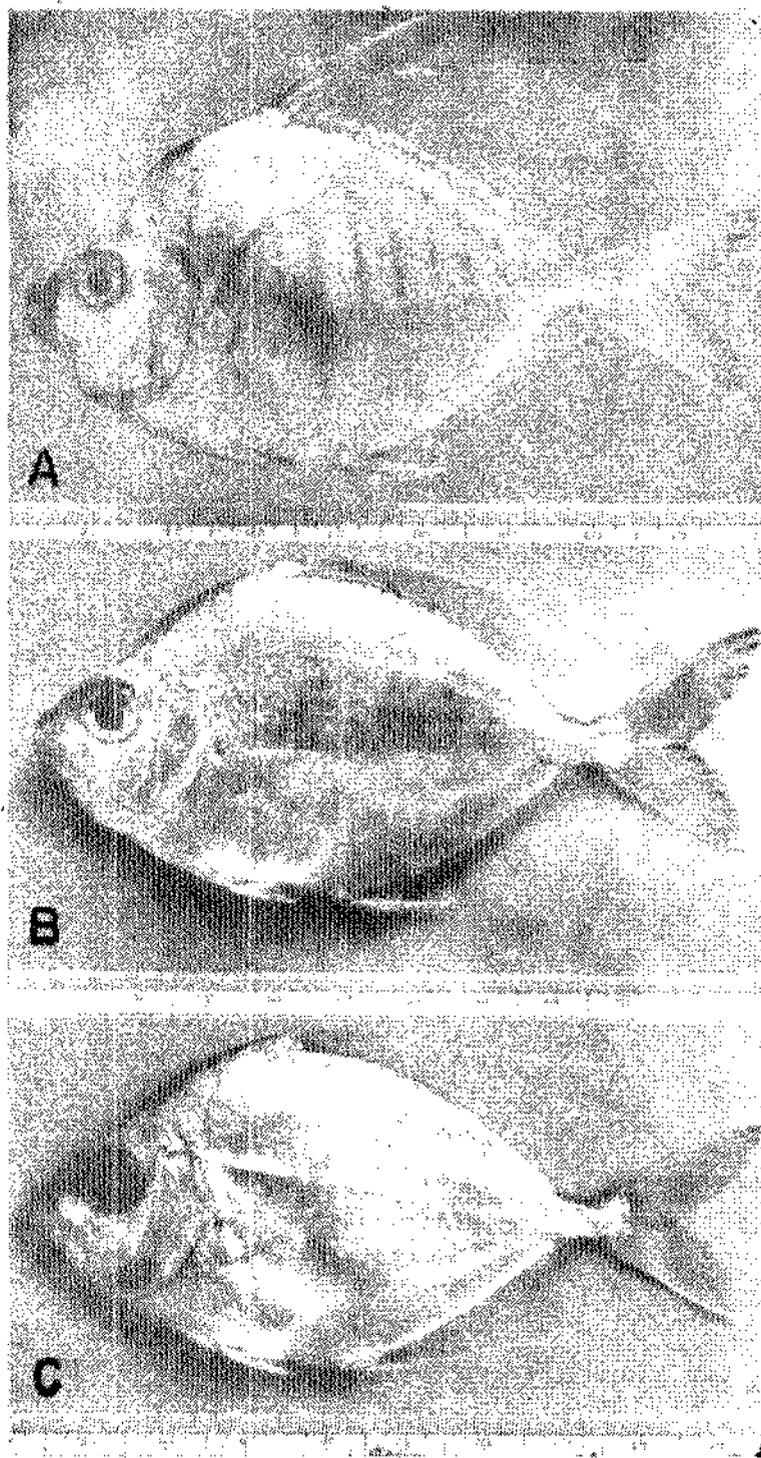


PLATE I. A. *Leionathus striatus* sp. nov., B. *Leionathus fasciatus* (Lacépède) and C. *Leionathus smithersi* (Rabibay and Ogilby).

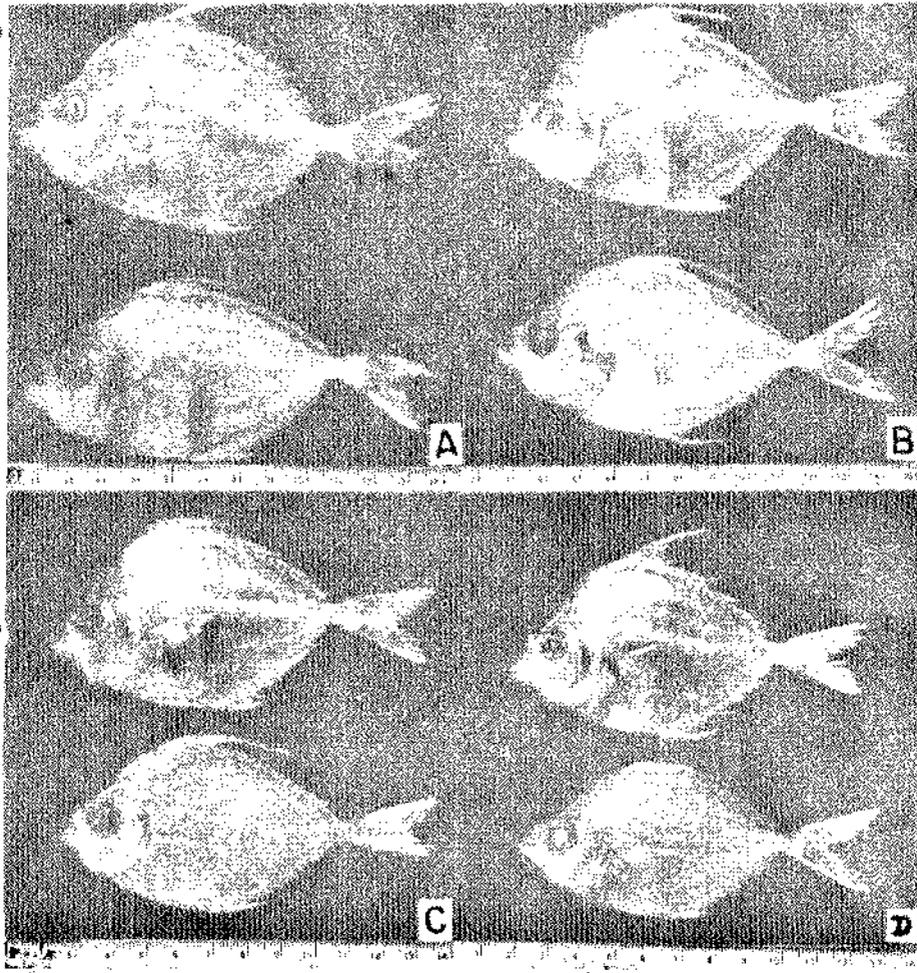


PLATE II. A to D, *Leognathus striatus* sp. nov. (upper) and *Leognathus fasciatus* (lower).

rakers in 10 specimens, 67-165 mm SL (88-212 mm TL) on outer most arch (14-16)+(0-1)+4+5, total 19-22; gill rakers well developed, those at extremities curved backward, each with double row of small spines. Scales small, all over body except chest, lateral line distinctly concave at commencement and convex afterwards, less so than dorsal profile and extends to a point little shorter than base of caudal fin. Dorsal and anal spines weak and flexible, laterally compressed, second dorsal spine filiform, compressed 1.12-2.37 in height of body, 1.97-3.67 in SL and 2.65-4.68 in TL, its tip reaching origin of 5-11 dorsal fin rays when flexed backward, 3rd dorsal spine 1.56-2.76 in 2nd dorsal spine, 2nd anal spine also compressed, 1.65-2.37 in head, 3rd anal spine 1.33-1.70 in second anal spine, 3rd and 4th dorsal spines and 3rd anal spine serrated anteriorly for about half length from base. Pectoral 4.20-4.69 in SL, 5.40-6.23 in TL, ventral 5.75-7.23 in SL, 7.41-9.33 in TL with a prominent axillary scale (its tip reaching tips of inner most ventral rays) which does not reach origin of anal. Caudal deeply forked.

Colour silvery, back less so than abdomen. As many as 11 distinct yellowish orange bands (in fresh condition) descending from dorsal margin of body and extending downwards distinctly beyond lateral line as well as median line of body. Bands become grey on preservation. First vertical band commences little in front and opposite to tip of nuchal spine and last one opposite to base of 12th dorsal ray. Margin of soft dorsal grey. Caudal lobes yellowish, their posterior margins dusky. Pectoral, ventral and anal hyaline. Base of the pectoral yellow, dotted black on inner side. Margin of anal yellow.

#### *Distribution*

So far known only from the collections made by the authors at Pamban, Mandapam and Kilakarai along the coast of the Gulf of Mannar.

### *Leiognathus fasciatus* (Lacépède)

(Fig. 2, Plate I B)

*Original description of Clupea fasciata Lacépède 1803*

*Leiognathus fasciatus* has been described by Lacépède in 1803 (*Hist. Nat. poiss.*, V., 460-463, type species *Clupea fasciata* from Mauritius). Lacépède (Oeuvres Du comte de Lacépède 1833 tome XII poissons VIII) included *La clupee a bandis*, *Clupea fasciata* Lacépède under *La clupee atherinoide* (p. 226) and gave the following diagnosis for *La clupee a bandis* (*Clupea fasciata*) on p. 425 :

Sept rayons aiguillonnés et dix-sept rayons articulés à la nageoire du dos ; deux rayons aiguillonnés et quatorze rayons articulés à celle de l'anus ; un rayon aiguillonné et cinq rayons articulés à chaque ventrale ; la caudale fourchue ; le premier rayon de la nageoire du dos, terminé par un long filament ; les deux mâchoires presque également avancées ; des bandes transversales depuis le sommet du dos jusqu'à la ligne laterale : des taches petites et arrondies au dessous de cette ligne.

The translation for the above passage is given below :

" 7 spines and 17 articulated rays on the dorsal fins ; 2 spines and 14 articulated rays on the anal ; 1 spine and 5 articulated rays on each ventral ; the caudal forked ; the 1st dorsal ray ending in a long filament ; the two mandibles almost equally advanced, the transversal bands from the summit of the back up to the lateral line, small rounded blotches below this line."

On pp. 463-464 the following description has been given for *La clupee a bandis* by Lacépède (1833) :

Dans la *clupee a bandes*, que Commerson a observée auprès des côtes de l'Isle de France.

La couleur générale argentée ; le dos bleuâtre ; les écailles si peu adhérentes, que le poisson en est lénué très-fréquemment ; les dents qui hérissent les mâchoires et qui sont extrêmement petites ; la grande facilité d'étendre le museau ; le sillon large et peu profond que présente l'occiput ; les yeux très-grands, arrondis, plats et rapprochés ; l'opercule composé de deux pièces ; le double orifice de chaque narine ; la ligne latérale qui consiste dans une série de petites lignes ; la position des ventrales très-près des nageoires de la poitrine :

composed of two pieces ; double orifice in each narine ; the lateral line consisting in a series small lines ; the position of ventrals very close to the fins of the chest .'

Since the above description of *Clupea fasciata* (= *Leiognathus fasciatus* Lacépède) given by Lacépède (1833) is not very precise and complete, it has been found necessary to redescribe the species based on recent data and information collected by the authors. However, the most significant character mentioned by Lacépède for the type is the presence of 'transvers bands

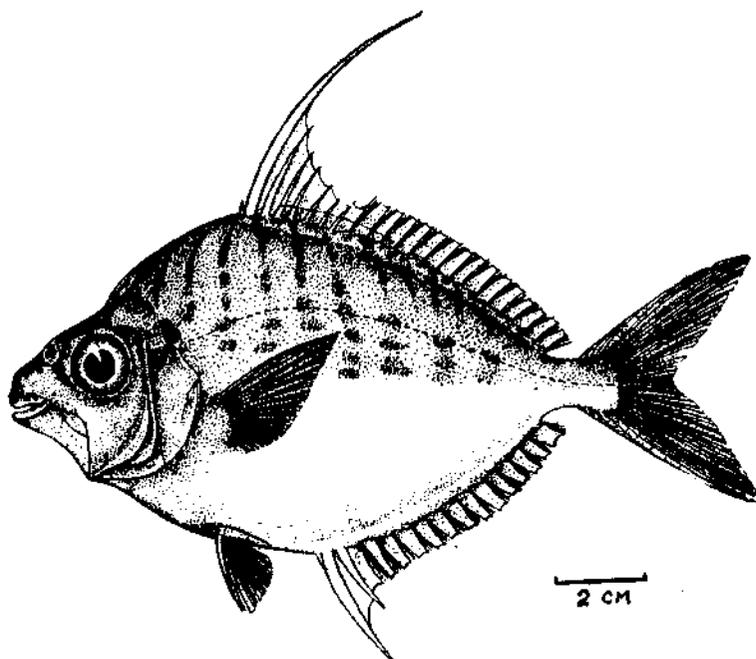


Fig. 2. *Leiognathus fasciatus* (Lacépède).

The translation for the above passage is given below :

'In the banded clupeid which Commerson has observed on the coast of France—the general colour silvery, the back bluish ; the scales so less adherent that the fish is often denuded, very small bristle-like teeth on mandibles, the great facility to extend the snout, the groove less deeper than the occiput ; the eyes very large rounded, flat and nearer ; the opercle

from the summit of the back upto the lateral line'. His reference to the 7 spines and 17 articulated rays on dorsal fin and 2 spines and 14 articulated rays is wrong since the species, like other leiognathids, possesses 8 spines and 16 rays in dorsal fin and 3 spines 14 rays in the anal fin.

*Description of Equula fasciata Valenciennes 1835*

The translated version is given below :

The *Equula* with bands

'(*Equula fasciata* nob; clupeo commers, m. ined. *Clupea fasciata* Lacépède v.p. 46 3 cuv; Mem du mus 1. pl 25, fig. 2).

This concerns the Karah of Russell which resembles very closely with the species about which Commerson has left a description where he calls it halec: *Corpore late Catheto-plateo, dorso supra lineam lateralem transversim fasciato infra eandem guttato* and a figure with name *clupeo* which M. Cuvier has engraved (*Mem du mus* t. 1, pl. 23, fig. 2) to show the affinity of the fish of Commerson with that which he has regarded as the *Zeus insidiator* and which is in fact of the same genera but the species of *Equula filigera*.

M. Lacépède deceived undoubtedly by these name Halec, and clupeo, has established his species of *Clupea fasciata* on this description, but he does not appear have got the figure which would undoubtedly have instructed line better on the veritable genera of the fish. It could not have any doubts that the name does not belong to the species of which we are speaking now and that is which the description confirms in all the details.

Their forms are like those of the preceding species; but according to the figure its second spine, the dorsal as well as anal will be slender; their extension will be fine as a hair and could as well reach beyond the middle of the fin to which each belongs; according to the description, the ray does not rise more than the double above the others. The base of the colour shines a better silvery bright; the brown undulated lines descending from the dorsal to the lateral line; above this line are the round blotches, irregularly scattered upto the height of the pectoral. All the rest is silvery.

The number of rays are marked on the figure.

D.8/15; A.3/19

but the description given by them as follows

D. 7/17, A 2/14, C. 16; p. 18; V. 1/5

on which he has remarked that Commerson has not counted the first and small spine either in the dorsal or in the anal, he has mistaken the large spine for the first. His specimen measured 7" in length.

He has observed it at Port Louis of the Island of France in November 1769; the species not very common in these waters. (*non-omnino uilis est, dicit*) and as it has very less flesh, nobody will mistake it at all.

Now it remains for us to talk about the *Equula* which with rather elevated body and with the sides of the anal as much, or more contrasting one from the other, has at the same time a much shorter snout, the bones of the nose not forming a pointed projection, in a manner that the mouth closed, the anterior part of the chamfer seems to rise and continues by a concave curve nearly to upto the height of the triangle formed by the interparietal'.

Bauchot (per. comm.) informed *Clupea fasciata* was described by Lacépède in *Hist. nat. poiss*; V. 425 and 458-465 from a manuscript text of Commerson. According to Valenciennes, 1835 in C. V. *Hist. nat. poiss*. X. 96-98, there was also a drawing in the ms of Commerson, drawing 'published' by Cuvier 1815 in *Mem. Mus*. I. pl. 23, fig. 2 with the name *Clupea fasciata* Lacépède. Valenciennes redescribed this species under the name *Equula fasciata*. Valenciennes writes that Lacépède did not close text and drawing, cause of his error in attributing the species to the genus *Clupea*.

The synonymy is

*Clupea fasciata* Lacépède, 1803

*Clupea fasciata* Cuvier, 1815

*Equula fasciata* Valenciennes, 1835

The principle reference is Lacépède, 1803, Lacépède, 1833 is an edition after without value about the nomenclatural point of view. According to her, there is no specimen of the type species. This specimen of Commerson

with total length '7 pouces' (about 190 mm) observed in Port-Louis (Mauritius) in November 1769 was not among the fish of Commerson studied by Cuvier and Valenciennes. So, as Lacépède did before, Cuvier and Valenciennes used only manuscript and drawing by Commerson.

*Redescription of Leiognathus fasciatus (Lacépède)*

A redescription of *L. fasciatus* (Lacépède) is given below based on examination of recent material from Mandapam region.

*Material*

40 specimens, 68-170 mm SL (91-215 mm TL) from Mandapam, Gulf of Mannar.

D VIII, 16; A III, 14. body compressed, dorsal and ventral profiles almost equally convex, dorsal profile showing two convexities, first, opposite and in front of front margin of eye and second, opposite hind margin of eye. From the point opposite hind margin of eye, dorsal profile gently convex upto origin of spinous dorsal fin. Height 1.76-2.06, head 3.04-3.41 in SL (2.30-2.75 and 3.91-4.43 in TL respectively); eye 2.64-3.26 in head. Interorbital space almost flat, bounded by two prominent ridges which continue as outer borders of nuchal spine which is more than twice (about  $2\frac{1}{2}$ ) in head. Central portion of nuchal spine elevated. Two small spines on top of head opposite to front border of eye, one nearer margin of eye being more prominent than one away from margin of eye. Mouth when protracted directed downwards; gape of mouth when closed opposite and above lower margin of eye, tip of maxilla just reaching front margin of eye. Lower margin of lower jaw very slightly concave, preopercle with obtuse angle, its lower margin finely serrated. Teeth small, numerous; gill rakers in 10 specimens, 68-150 mm SL (85-192 mm TL) on outer most arch (14-15)+(0-1)+(4-5), total 19-20; gill rakers poorly developed, those at

extremities curved backward, each with double row of small spines. Scales small, all over body except chest. Lateral line very slightly concave at commencement and convex thereafter, but less so when compared to dorsal profile and extends upto a little distance short of base of caudal fin. Dorsal and anal fin spines weak and flexible, laterally compressed. 2nd dorsal spine filiform, its tip extending up to origin of 6-16 soft dorsal ray when flexed backward, its length being 0.95-1.80 in height of body, 1.80-3.47 in SL and 2.35-4.44 in TL. 3rd dorsal spine 1.57-3.28 in 2nd dorsal spine. 2nd anal spine elongate, 1.05-2.00 in head, 3rd anal spine 1.25-2.21 in 2nd anal spine. Third and 4th dorsal spines and 3rd anal spine serrated anteriorly for about half length from base. Pectoral 3.74-4.59 in SL and 5.06-6.00 in TL, ventral 6.20-7.93 in SL and 8.00-10.20 in TL with prominent axillary scale (its tip reaching tips of inner most rays) which does not reach origin of anal. Caudal deeply forked.

Silvery, back equally silvery as abdomen, a vague light blue blotch midway between lateral line and base of anal fin, 14 indistinct, grey vertical bands (both in fresh and preserved conditions) descend upto and little beyond lateral line. In between lateral line and median line of body, four big oval yellow blotches found in addition to few smaller blotches of same colour. Snout and top of head light grey, dorsal fin hyaline with grey margin. Inner side of pectoral base dotted black, above which a small area is covered by light yellow colour. Pectorals and ventrals hyaline, but pectoral axil yellow, its base dotted black; anal spines white, first few anal rays light yellow in colour, others hyaline. Caudal fin dusky with posterior margin black.

REMARKS

Cuvier of Valenciennes (1835, *Hist. nat. Poiss.*, 10: 92-98) described *Equula filigera*, *E. longispinis*, *E. cara* and *E. fasciata*, all of which are

considered synonymous of *Leiognathus fasciatus*. For *E. filigera* the important character given by them is the long second dorsal and anal spines, which are slender, the 2nd dorsal spine being equal to height of body, its colour silvery, very often uniform, sometimes with ventral brownish blotches and bands, which is more an effect of reflection than a colour pattern. The fins are pale with some black colour in the pectoral axil and brown colour on the snout. For *E. longispinis*, the most important

The new species (Fig. 1, Pl. I A) resembles more closely *L. fasciatus* (Fig. 2, Pl. I B) and somewhat distantly *L. smithursti* (Fig. 3, Pl. I C). The three species generally resembles in body shape and filiform nature of the 2nd dorsal spine. However, they differ from one another in other morphometric characteristics. The three species are compared for important characters in Table 1. *Leiognathus striatus* and *Leiognathus fasciatus* are compared sizewise in Plate II.

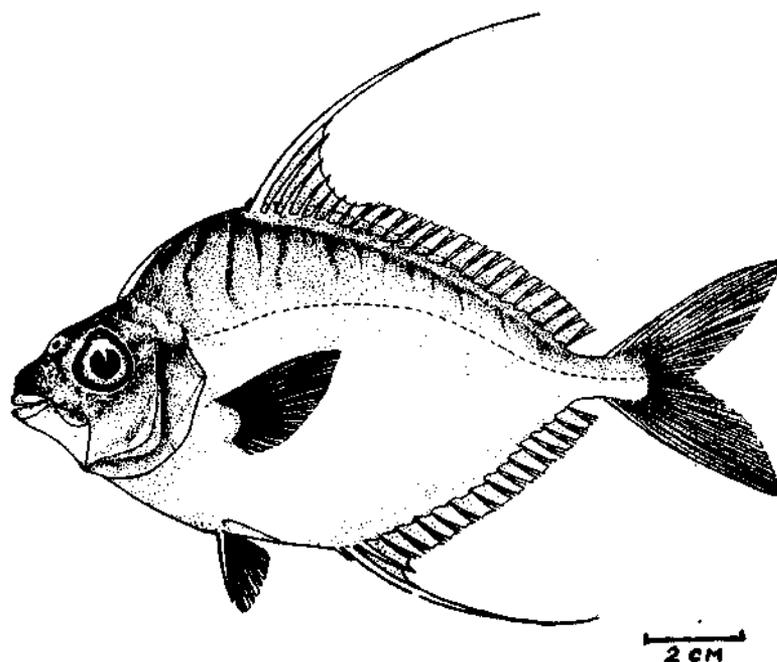


Fig. 3. *Leiognathus smithursti* (Ramsay and Ogilby).

character given by them is the 'second spine of dorsal and second spine of anal prolong well enough'. The specimen is stated to have a beautiful silvery colour without any appearance of blotches. For *E. cara*, the spines of dorsal and anal are stated be less longer and silvery base of the colour varies with blotches and bands, vertical and irregular and of a deep colour.

From the occurrence point of view, *L. fasciatus* is more commonly met with in commercial catches from the Gulf of Mannar compared to the new species and *L. smithursti*. However, it was noticed than on certain occasions, large specimens of the new species (230-290 mm TL) are caught in trawl nets operated on the southern side of Hare Island in the Gulf of Mannar. Young specimens of the new

TABLE 1. Comparison of *L. striatus* sp. nov., *L. fasciatus* and *L. smithursti* for certain important morphological characters

Characters	<i>L. striatus</i>	<i>L. fasciatus</i>	<i>L. smithursti</i>
Dorsal profile	Pre-dorsal region shows a strong hump.	Pre-dorsal region shows a gentle convexity.	Pre-dorsal region shows a gentle convexity.
Length of nuchal spine	Twice in head.	More than twice in head.	More than twice in head.
Extension of posterior tip of maxilla	Posterior tip of maxilla just surpassing the front border of eye.	Posterior tip of maxilla just reaching the front border of eye.	Posterior tip of maxilla just reaching the front border of eye.
Mandible	Strongly concave.	Slightly concave.	Slightly concave.
Second dorsal spine	1.12-2.37 mm in body depth, filiform, extends upto origin of 5-11 of dorsal fin ray.	0.95-1.80 in body depth, filiform, extends upto origin of 6-16 dorsal fin ray.	Much higher than height of body, excessively filiform, reaching nearly the tip of caudal fin.
Second anal spine	Not filiform, reaching origin of 4-5 anal fin ray.	Filiform, reaching origin of 4-8 anal fin ray.	Excessively filiform, reaching nearly the tip of caudal fin.
Gill rakers	Long, slender and flexible.	Short, stumpy and stiff.	Short, stumpy and stiff.
Vertical bands	Eleven distinct yellowish orange, vertical bands crossing lateral line and median line of the body.	Fourteen indistinct grey vertical bands just crossing lateral line.	Faint, unevenly spaced and horizontally elongate indistinct grey blotches above lateral line.

species (60-95 mm TL) have also been recorded in shore seine catches landed at Kundugal point (near Pamban) from the Gulf of Mannar. Specimens of comparable sizes in *L. fasciatus* and *L. smithursti* have also been observed in the commercial catches.

Review of previous literature pertaining to description of *L. fasciatus* Gunther (1860), Day (1876), Weber and de Beaufort (1931), Munro (1955, 1960), Chu (1962), Tiews and Caces Borja (1965), Munro (1967), Kuhl-morgen (1968), Fowler (1928), Kuhl-morgen (1974) indicate that in most of the cases, *L. fasciatus* has been correctly identified and described. However, Weber and de Beaufort (1931) and Munro (1955, 1967) mention back, is strongly elevated behind occiput or even the presence of hump behind the occiput. This

indicates the possibility of the material of true *L. fasciatus* having been mixed with material of the new species now described which closely resembles *L. fasciatus*. It may also be remarked here that in the case of *L. fasciatus* the irregularly spaced grey vertical bands cross the lateral line only whereas in the case of the new species the vertical bands cross the lateral line as well as the median line of the body. It was observed that the vertical bands in *L. fasciatus* become diffuse and fade off completely with time. It is for this reason perhaps that earlier authors have mentioned that the bands in *L. fasciatus* are diffuse, indistinct and have also not stated precisely the lower limit of extension of the vertical bands in this species. In the new species, the vertical bands are more prominent, distinct and remain for a long time.

## REFERENCES

- DAY, F. 1876. *The fishes of India*. Bernard Quitch, London, pp. 237-241.
- FOWLER, W. H. 1928. The Fisheries of Oceania. *Mem. Bish. Bern. P. Bishop Mus.*, 10 : 1-540.
- GUNTHER, A. 1860. *Catalogue of the Acanthopterygian fishes in the collection of the British Museum 2*. British Museum. London, pp. 586.
- JAMES, P. S. B. R. 1968. *Leiognathus leuciscus* (Gunther) and *L. smithursti* (Ramsay and Ogilby) (Family: Leiognathidae; Pisces). Two new records from Indian Seas. *J. mar. biol. Ass. India*, 9 (2) : 300-302.
- 1969. A new species of silverbelly *Leiognathus jonesi* sp. nov. (Family Leiognathidae; Pisces) from Indian Seas. *Ibid.*, 11 (1 & 2) : 316-319.
- 1975. A systematic review of the fishes of the family Leiognathidae. *Ibid.*, 17 (1) : 138-172.
- 1984. Leiognathidae. In: W. Fischer and G. Bianchi (Ed.) *FAO Species identification sheets for fishery purposes western Indian Ocean (Fishing area 51)*. FAO, Rome, 2.
- JAYABALAN, N. 1985. A new species of Silverbelly *Gazza shettyi* (Pisces: Leiognathidae) from the Bay of Bengal. *Matsya*, 11 : 42-45.
- KUHLMORGEN-HILLE, GEORGE 1968. An illustrated field key to the fish family Leiognathidae in the Gulf of Thailand. *Contrib. Mar. Fish. Lab.*, Bangkok, 12 : 1-7.
- KUHLMORGEN-HILLE 1974. Leiognathidae. In: L. Fischer and P.J.P. Whitehead (Ed.) *FAO species identification sheets for fishery purposes, Eastern Indian Ocean (Fishing area 57) and Western Central Pacific (Fishing area 71)*. FAO, Rome, 2.
- MUNRO, I. S. R. 1955. *The marine and fresh water fishes of Ceylon*. Halstead Press, Sydney, p. 145.
- 1960. *Handbook of Australian fishes*. Fisheries Newsletter, 19 (6) : 133-136.
- 1967. *The fishes of New Guinea*. Department of Agriculture, stock and fisheries, Port Moresby West Guinea, pp. 238-241.
- RANI SINGH AND P. K. TALWAR 1978 a. On the little known Ponyfish *Gazza aklamys* Jordan and starks (Pisces: Leiognathidae) in the Indian waters. *Curr. Sci.*, 47 (23) : 930-931.

- 1978 b: On a new species of silver belly *Leiognathus indicus* sp. nov. Pisces: Leiognathidae (from the Bay of Bengal). *Bull. Zool. Surv. India*, 1 (3) : 275-277.
- SREENIVASARENGAN, S., S. K. BALAKUMAR AND M. BADRUDEEN (MS). *Leiognathus elongatus* (Gunther) (Family Leiognathidae: Pisces) A new record from Indian Seas.
- WEBER, W. AND L. F. DE BEAUFORT 1931. *The fishes of Indo-Australian Archipelago*, 6, E.J. Bull. Ltd. Leiden.
- YANTING, T. CHU 1962. *Fishes of the South China Sea*. pp. 438-455.
- TIEWS, K. AND P. CACES, BORJA 1965. On the availability of the fish of the family Leiognathidae Lacépède in Manila Bay and San Miguel Bay and on their accessibility to controversial fishing gears. *Philippines. J. Fish.*, 7 (1) : 59-86.