

**STUDY ON THE MORPHOMETRIC AND MERISTIC CHARACTERISTICS  
OF SPLENDID SILVER BELLY - *LEIOGNATHUS SPLENDENS* (CUVIER)  
FROM BOMBAY COAST**

**DEEPAK GULATI AND P. ACHARYA**

*Central Institute of Fisheries Education, (ICAR), Versova, Mumbai 400 061.*

**ABSTRACT**

Ten morphometric and six meristic characters of *Leiognathus splendens* (Cuvier) of Bombay Coast have been studied sexwise. Regression and sexwise difference if any between the compared morphometric characteristics have been worked out. Range, mode, standard deviation, co-efficient of variation of 6 meristic characters have been analysed. There was no significant difference between the sexes in morphometric and any deviation in the meristic characters.

**Keywords :** Silver bellies, *Morphometry, Bombay Coast.*

**INTRODUCTION**

*Leiognathus splendens* is one of the species of silver bellies, belonging to the family Leiognathidae, commonly known as "Ponny fish". *L. splendens* though most commonly occur in Indo-Pacific region, it is not abundant along Bombay coast. There are about 20 species of silver bellies commonly available in Indian coasts, largest amongst those is *L. equalus* growing above 26 cms. *L. splendens* is the second largest species of this family growing to about 15 cm. They inhabit shallow waters up to 40 m. depth, feed mainly on small crustaceans, foraminiferans, copepods, phytoplankton etc., spawn in deeper water and are generally caught by bag nets and shore seines. It is marketed dried, salted and also converted into fish meal. The fishes of this family harbour bioluminescence bacteria. During the years 1997 and 1998 silver bellies contributed 66,426 and 56,528 tons

to the total marine fish landings of India.

In the present paper an attempt has been made to define identification characteristics of *L. splendens* of Bombay region by studying its morphometric and meristic characters.

**MATERIAL AND METHODS**

A total of 77 specimens ranging 77-110 mm in total length constituted by 34 males and 36 females, sampled at random from the Sassoon dock and Ferry wharf landing centres of Bombay during Feb - May 1990, formed the material for the present studies.

Ten morphometric and six meristic characters of the specimens were studied following the standard least square method described by Snedecor (1967), Laevestu (1965) and followed by many workers *viz.*

Dwivedi and Menezes (1974), Chondar (1974), Acharya and Dwivedi (1984), Sivraj and Dwivedi (1982) etc. Sexwise differences if any, in regression co-efficients slopes  $b$  and intercepts  $a$  were examined by the analysis of covariance as described by Snedecor and Cochran (1967).

The morphometric characteristics studied *viz.* Standard length (SL), Pre dorsal length (PDL), Pre ventral length (PVL), Pre anal length (PAL), Pre pectoral length (PPL), Body depth (BD), and Head length (HL) have been compared against Total length (TL) (Figs. I - VII) whereas Snout length (SntL), Post orbital length (POL) and Snout width (SntW) have been compared against Head length (HL) (Figs. VIII - X), sexwise separately.

The fitted relationships between the compared values of 'a', 'b' and 'r' (co-efficient of correlation), difference in the slope (d.f) and intercept (a) worked out sexwise separately have been depicted in Table 1 while Table 2 gives the range, mode, standard deviation, mean  $\pm$  S.E. and co-efficient of variation of the 6 meristic characteristics *viz.* the numbers of dorsal fin spines and rays, pectoral fin spines and rays. Ventral fin spines and rays, anal fin spines and rays, lateral line scales, and number of gill rakers studied. Table 3 shows the angles of elevations of the different body parts of males and females compared against TL and HL respectively.

## RESULTS AND DISCUSSION

In case of morphometric characteristics (Table 1) "b" values indicate that, amongst the males, rate of growth of different body

parts in length, compared against their TL, is highest in the case of SL (0.661), followed by BD (0.479), PDL (0.397), HL (0.29), PPL (0.279) and PVL (0.216). In the females rate of growth of different body parts in length in comparison to TL in diminishing order, are of SL (0.762), PAL (0.449, BD (0.430), PDL (0.306), HL (0.284) and PPL (0.278).

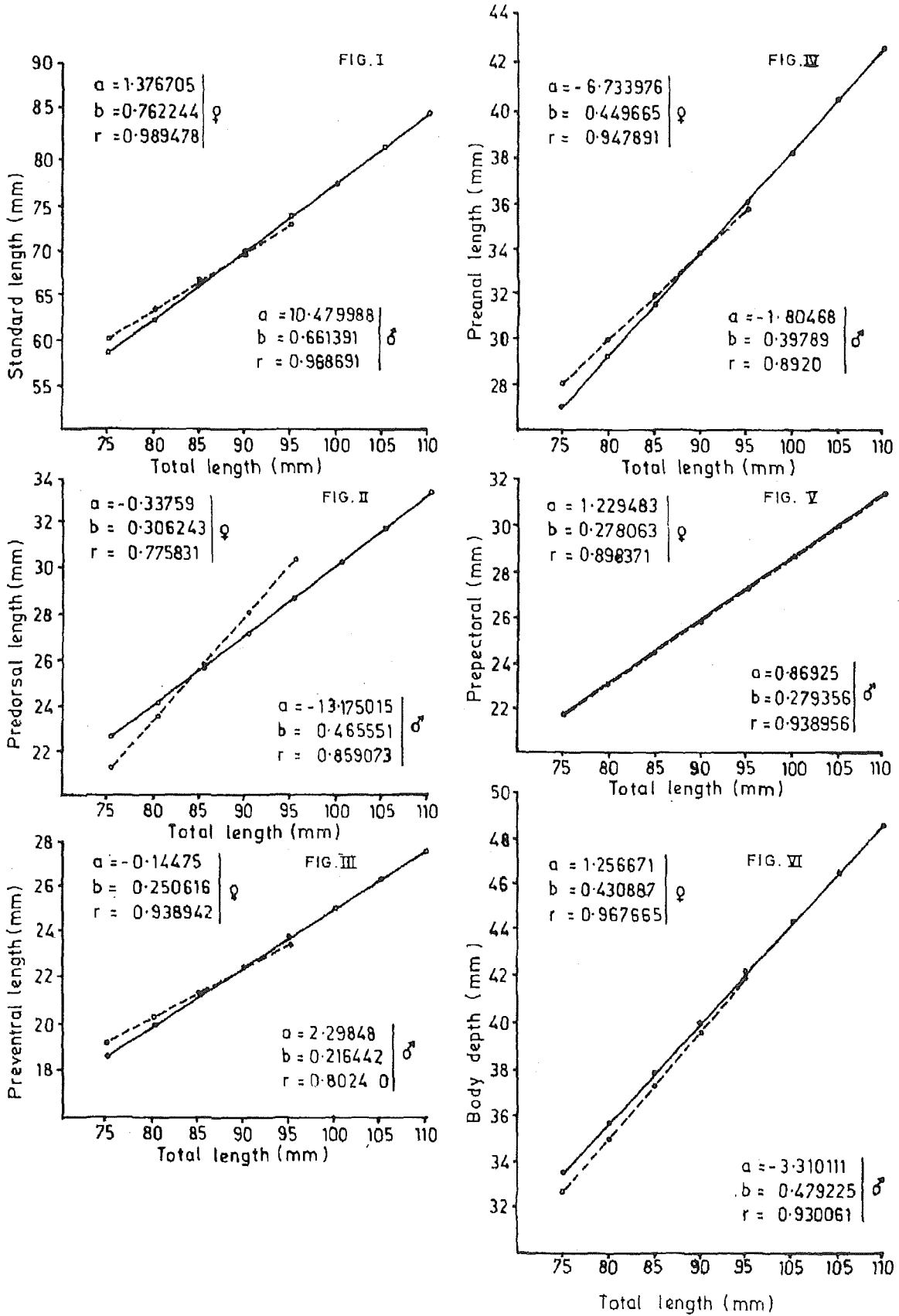
The 'b' values of morphometric characteristics of males compared against their HL, indicate that rate of growth of PDL (0.256) is highest, followed by SntL (0.208) and SntW (0.197) whereas in females SntL (0.390) grows at fastest rate followed by PDL (0.293) and SNTW (0.146) as compared to HL.

Co-efficient of correlation (r) values in males indicate that characteristics compared against TL are highly co-related to each other. Highest correlation exists between the SL/TL (0.968) followed by PPL/TL (0.938), BD/TL (0.93), PAL/TL (0.892), PDL/TL (0.859), HL/TL (0.856) and PVL/TL (0.802). Amongst the characters compared against HL relation between SntW/HL (0.769), POL/HL (0.724) and SntL/HL (0.644) follows in diminishing order.

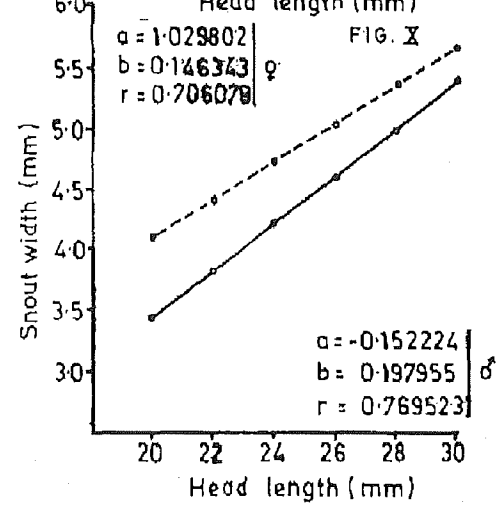
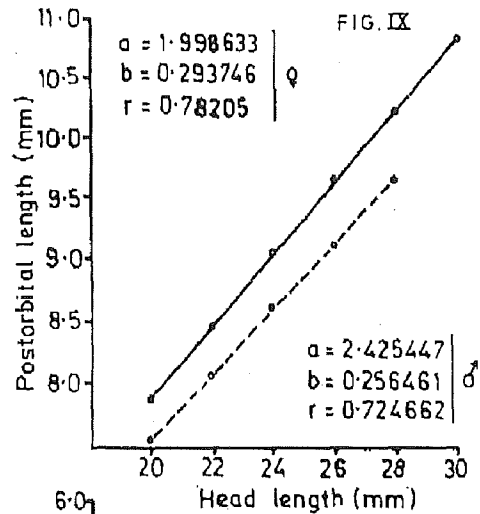
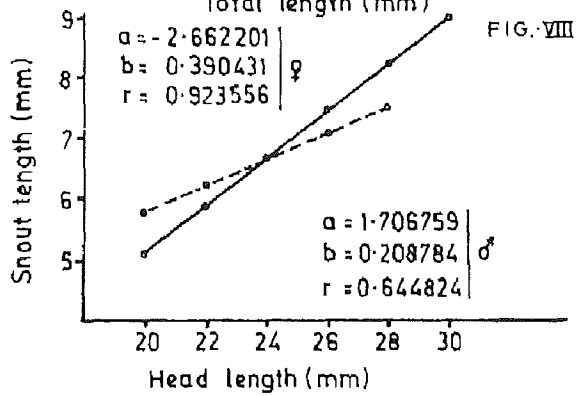
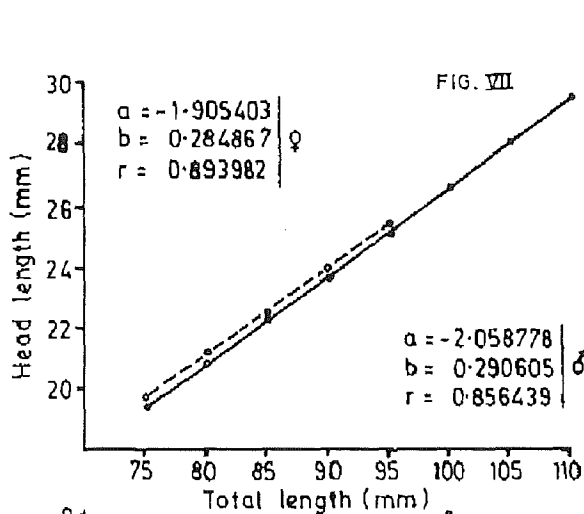
In females, characters compared against TL exhibits highest co-relation between SL/TL (0.989) followed by BD/TL (0.967), PAL/TL (0.947), PVL/TL (0.938 PPL/TL (0.898), HL/TL (0.893) and PDL/TL (0.775), whereas in case of characters compared against HL, SntL/HL (0.923) exhibits highest correlation followed by PDL/HL (0.782) and SntW/HL (0.706) "b" values have been converted into angles of elevations (Table 3) to indicate the rates of growths of

**Table 1 : Relationships of different body parts with total length (TL) and Head Length (HL) in *Leiognathus splendens***

Relationships		'a' value	'b' value	'r' value	F	dif.	P.	Remarks
SL/TL	♂	10.479988	0.661391	0.968691	4.0092	131	0.05	No significant diff.
	♀	1.376705	0.762244	0.989478	0.1874	132	0.05	
PDL/TL	♂	13.175015	0.465551	0.859073	2.6066	131	0.05	No difference
	♀	0.33759	0.306243	0.775831	1.5358	132	0.05	
PVL/TL	♂	2.298480	0.216442	0.802400	0.5693	131	0.05	No significant diff.
	♀ (-)	0.144750	0.250616	0.938942	0.0155	132	0.05	
PAL/TL	♂ (-)	1.80468	0.397890	0.89207	0.6245	131	0.05	"
	♀ (-)	6.733976	0.449665	0.947891	0.7137	132	0.05	"
PPL/TL	♂	0.8692250	0.279356	0.938956	0.0091	131	0.05	"
	♀	1.229483	0.278063	0.898371	0.0866	132	0.05	"
BD/TL	♂ (-)	3.310111	0.479225	0.930061	0.7867	131	0.05	"
	♀	1.256671	0.430857	0.967665	0.6351	132	0.05	"
HL/TL	♂ (-)	2.058778	0.290605	0.856439	0.0099	130	0.05	"
	♀ (-)	1.905403	0.284867	0.893982	1.0485	131	0.05	"
Snt L/HL	♂	1.706759	0.208784	0.644824	6.0707	131	0.05	"
	♀ (-)	2.662201	0.390431	0.923556	1.8308	132	0.05	"
POL/HL	♂	2.425447	0.256461	0.724662	1.2409	131	0.05	"
	♀	1.998633	0.293746	0.78205	21.7504	132	0.05	"
SntW/HL	♂ (-)	0.152224	0.197955	0.769523	0.8126	131	0.05	Insignificant
	♀ (-)	1.029802	0.146343	0.706079	0.1265	132	0.05	



*Various morphometric characters compared against total length*



*Various morphometric characters compared against head length*

**Table 2 : Meristic characters of *L. splendens*. Their Range, Mode, Standard deviation, Mean  $\pm$  S.E. and C.V.**

Meristic features	No. of fish	Range	Mode	Standard deviation	Mean $\pm$ S.E.	C.V.
Dorsal spine/rays	35	8/16	—	No variation	-----	
Pectoral rays	35	17-19	17	0.4037	17.1143+0.06823	2.3588
Ventral spine/rays	35	1/5	—	No variation	-----	-----
Anal spine/ray	35	3/14	—	No variation	-----	-----
Laterallinescale	35	43-59	47	4.334	50.0857+0.7326	8.6531
Gill racker	35	27-28	28	0.284	27.9143+0.048	1.01734

**Table 3 : Showing angles of elevations between the compared metric characters of *L. splendens* sexwise.**

Compared characteristics	Sex	'b' values	'a' values	Angles of elevations
Total length-standard length	Male	0.661391	10.479988	33°
	Female	0.76224	1.376705	37°
Total length-predorsal length	Male	0.465551	13.175015	25°
	Female	0.306343	0.33759	17°
Total length-preventral length	Male	0.216442	2.29848	12°
	Female	0.250616	(-)0.14475	14°
Total length-preanal length	Male	0.39789	(-)1.80468	22°
	Female	0.449685	(-)6.733976	24°
Total length and head length	Male	0.290605	(-)2.058778	16°
	Female	0.284867	(-)1.905403	16°
Total length and prepectoral length	Male	0.279366	0.86925	16°
	Female	0.278063	1.229483	16°
Total length and body depth	Male	0.479225	(-)3.310111	26°
	Female	0.430857	1.256671	23°
Head length Snout length	Male	0.208784	1.706759	14°
	Female	0.390431	(-)2.662201	21°
Head length-postorital	Male	0.256461	2.425447	14°
	Female	0.293746	1.998633	16°
Head length Snout width	Male	0.197955	(-)0.152224	11°
	Female	0.146343	(-)1.029802	8°

different body parts of male and female *L.splendens* specimens against their TL and HL more clearly.

The regressions of different body parts drawn sexwise separately against TL and HL have been depicted in figures I-X. Although apparently it appears from the regressions of SL/TL (Fig.II), SntL/HL Fig. VIII, PDL/HL (Fig. IX) and SntW/HL (Fig.X), that there are some differences between the regressions of males and females, regressions co-efficients and intercepts examined by the analysis of covariance does not show any significant difference between the sexes except in the cases of SntL/HL (Fig. VIII) and PDL/HL (Fig. IX). Analysis of covariance reveals significant difference in the slopes but no significant difference in the intercepts between SntL/HL (Fig.III); whereas insignificant difference between the sexes in the slopes and significant difference between the sexes in the intercepts have been observed in the sexwise regressions of PDL/HL (Fig.IX).

An analysis of meristic characters of 35 specimens at random (Table 2) indicated that *Leiognathus splendens* possess 8 spines and is soft rays in their dorsal fins, three spines and 14 soft rays in their anal fins invariably. This is in conformity with Talwar & Kacker (1984). The ventral fins of the specimens possessed one spine and 5 rays without any variation. However, numbers of pectoral fin rays and lateral line scales ranged from 17-19 and 43-54 respectively with their modes at 17 and 47 respectively. Number of the gill rakes on their left side first gill arches varied from 27 to 28 with the mode at 28. Standard

deviations, mean  $\pm$  S.E. and co-efficient of variations of pectoral fin rays, lateral line scales and gill rakers have been depicted in table 2.

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