

ON CERTAIN ANOMALIES IN THE FISHES OF THE FAMILY LEIOGNATHIDAE

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INTRODUCTION

INSTANCES of anomalies are quite common in fishes and were reported by earlier authors in a number of families of fishes, involving different parts of the body. Dawson (1964) gave a valuable bibliography on the subject. Some recent accounts on anomalies in fishes from India are those of Kapoor and Sarkar (1955), Sarkar and Kapoor (1956), Sarkar and Kaushik (1958), Tandon (1959), James (1960), Kaushik (1960), Luther (1962), Chhapgar (1964), Bensam (1965), Bapat and Radhakrishnan (1967) and Rangarajan (1967). During the course of study of the biology and fishery of the fishes of the family Leiognathidae from the Palk Bay and Gulf of Mannar, the authors came across seventeen specimens of seven different species of this family showing certain anomalies. These pertain to the body profile, fins, eye and colour. A brief description of these anomalies is given in this paper. The specimens were deposited in the Reference Collection Museum at Central Marine Fisheries Research Institute (Five specimens of *Leiognathus dussumieri*—Reg. No. F. 98/594 A; Three specimens of *L. brevirostris*—Reg. No. F. 98/283 B; Two specimens of *L. bindus*—Reg. No. F. 98/280 B; Four specimens of *Leiognathus*—Reg. No. F. 98/593 A; one specimen of *L. fasciatus*—Reg. No. F. 98/279 B; One specimen of *L. leuciscus*—Reg. No. F. 98/569 A; and one specimen of *L. lincoatus*—Reg. No. F. 98/595 A).

OBSERVATIONS

1. *Body profile*: Four species, *Leiognathus dussumieri*, *L. brevirostris*, *L. bindus* and *Leiognathus* show unusual body profile. In the case of *L. dussumieri*, in one specimen (Pl. I, fig. 2), a notch is present behind spinous dorsal with corresponding dip in the lateral line (No. 2)*. In another specimen (No. 4), a concavity is present in the soft anal region while a third specimen (No. 5) shows a concavity in the spinous dorsal region (Pl. II, fig. 1). In *L. brevirostris* (Pl. I, fig. 5) a notch is present between the tip of supra-occipital spine and origin of spinous dorsal (No. 7). Perhaps as a result of this, the first dorsal spine in this specimen arises slightly from the right side of the body instead of mid-dorsally. In another specimen of the same species (No. 6), the supra-occipital region is unusually elevated (Pl. I, fig. 4) which is also found in a third specimen (No. 8). One specimen of *L. bindus* (No. 9) shows a strong concavity between base of ventrals and origin of anal. The first anal spine is absent in the fish (Pl. I, fig. 6). In another specimen of this species (No. 10), the characteristic trenchant shape of the ventral profile in the pre-anal region has become less convex, the post-anal region retaining the normal convexity,

* Number corresponds to serial number in Table I.

† New species being Described.

with the result the ventral profile shows a bilobed appearance. Due to this, the ventral fins are tucked in before the post-anal region and are shorter for a fish of that size (Pl. II, fig. 2). In *Lelognathus* (No. 12), the unusual dorsal profile is similar to that seen in the first specimen of *L. brevirostris* (No. 7) but is deeper (Pl. I, fig. 8). A second specimen of this species (No. 13) shows a concavity in the ventral profile in the region of soft anal,—the fourth, fifth and six anal rays being absent.

In one specimen of *L. leuciscus* (No. 16), the ventral profile of body has a concavity in the region of soft anal fin (Pl. II, fig. 3), the third and fourth anal rays being absent. The convex ventral profile of body in the pre-anal region behind head of one specimen and *L. lincolatus* (No. 17) was found to have been pressed upwards resulting in a concavity and lesser body depth at this region than normal. The ventral fins are altogether absent in this specimen with no external trace (Pl. II, fig. 4). The scale pockets in the region are large and sparsely distributed, unlike the normal small and close-set arrangement (Text-fig. 2).

2. *Fins*: Five species, *L. dussumieri*, *L. brevirostris*, *L. bindus*, *L. fasciatus* and *L. lincolatus* show anomalies in the fins. In one specimen of *L. dussumieri* (No. 1), the upper caudal lobe is smaller than the lower (Pl. I, fig. 1). As already mentioned above, in connection with the first category of anomalies, the first dorsal spine in one specimen of *L. brevirostris* (No. 7) arises slightly to the right side of the body, the first anal spine in one specimen of *L. bindus* is absent (No. 9), and the ventral fins are shorter in another specimen of *L. bindus* (No. 10) when compared to the size of fish. The most striking and unusual condition of fin, is the presence of a filiform first dorsal spine (usually only the second is filiform) in *L. fasciatus** (Pl. I, fig. 9) where it is less than half and more than one-third of second and slightly longer than third spine (No. 15). In its normal condition, it is a very minute spine when compared to the second. This unusually elongate first dorsal spine arises slightly from the right side of the body. As in normal specimens, the first spine is depressed and the following ones are compressed. The complete absence of ventral fins in one specimen of *L. lincolatus* (No. 17), already mentioned in connection with anomalies of body profile, is significant. On dissection, it was found that the pelvic girdles of both sides are completely absent.

3. *Eye*: The anomaly in the eye is seen in a specimen (No. 3) of *L. dussumieri* (Pl. I, fig. 3). The eye on the left side does not show distinct iris and pupil and is whitish in colour. The eye of the right side is normal, suggesting a condition of unilateral eye deficiency.

4. *Colour*: Unusual colour is seen in two specimens of *Lelognathus* where, in one specimen (No. 11), the tips of the eighth and ninth rays (Pl. I, fig. 7) and in the other specimen (No. 14), the middle portion of seventh, eighth and ninth rays in the upper caudal lobe are deep black in colour, in addition to the normal grey posterior margins of both lobes of caudal fin.

Outline sketches of some of the anomalies referred to in Plates I and II are shown in Text-figure 1 and Text figure 2. Morphometric and meristic data of the seventeen specimens showing the anomalies are given in Table I.

* The authors are thankful to Mr. V. Sriramachandra Murty for the specimen.

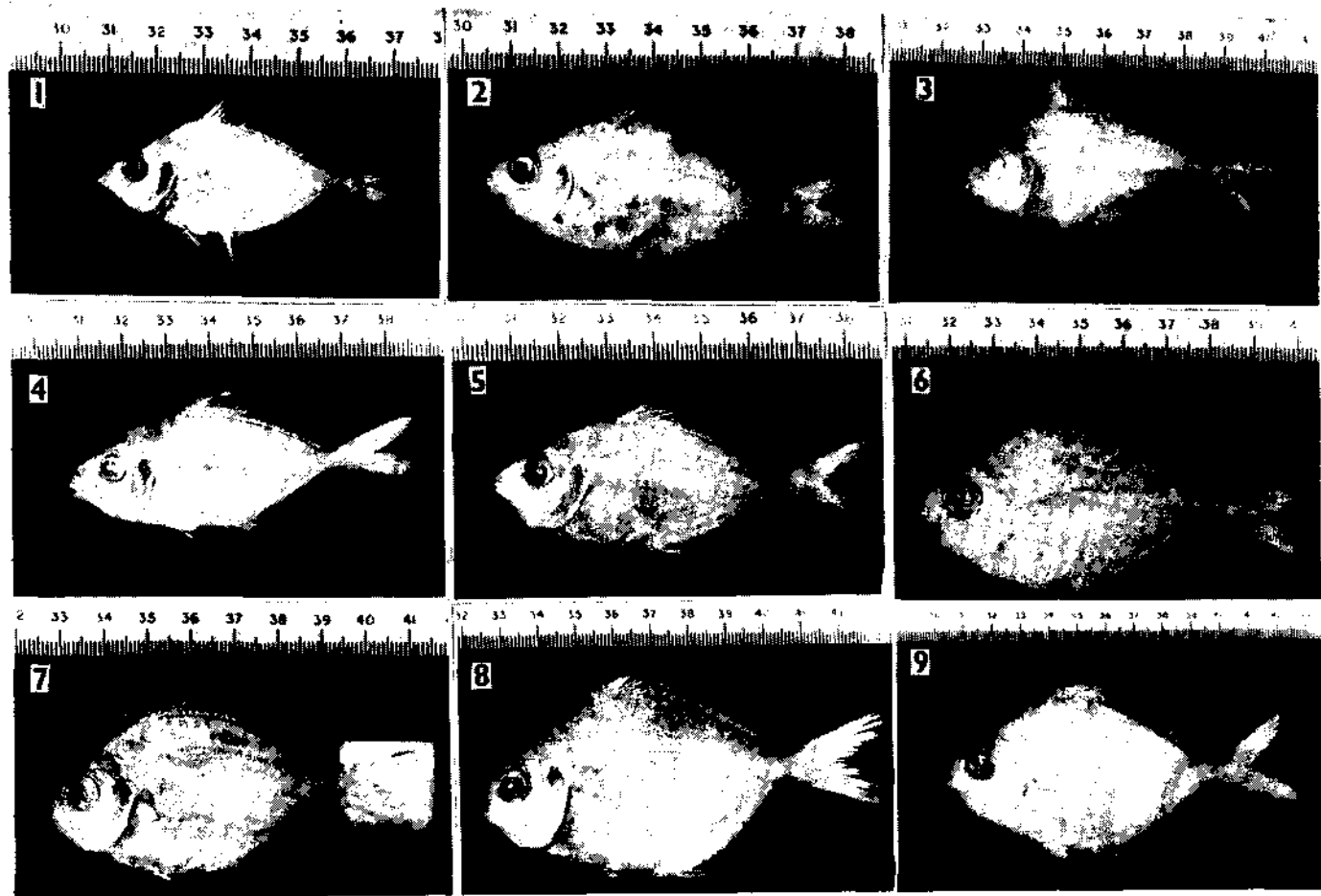


FIG. 1. *Leiognathus dussumieri*—smaller upper caudal lobe. 2. *L. dussumieri*—notch behind spinous dorsal. 3. *L. dussumieri*—defective left eye. 4. *L. brevirostris*—supraoccipital region strongly elevated. 5. *L. brevirostris*—notch before spinous dorsal. 6. *L. bindus*—concavity between base of ventrals and anal, first anal spine absent. 7. *Leiognathus* sp.—tips of 8th and 9th rays in upper caudal lobe black. 8. *Leiognathus* sp.—concavity in front of spinous dorsal. 9. *L. fasciatus*—unusually elongate, filiform first dorsal spine. (Photographs by Mr. S. P. D. Ghanshani).

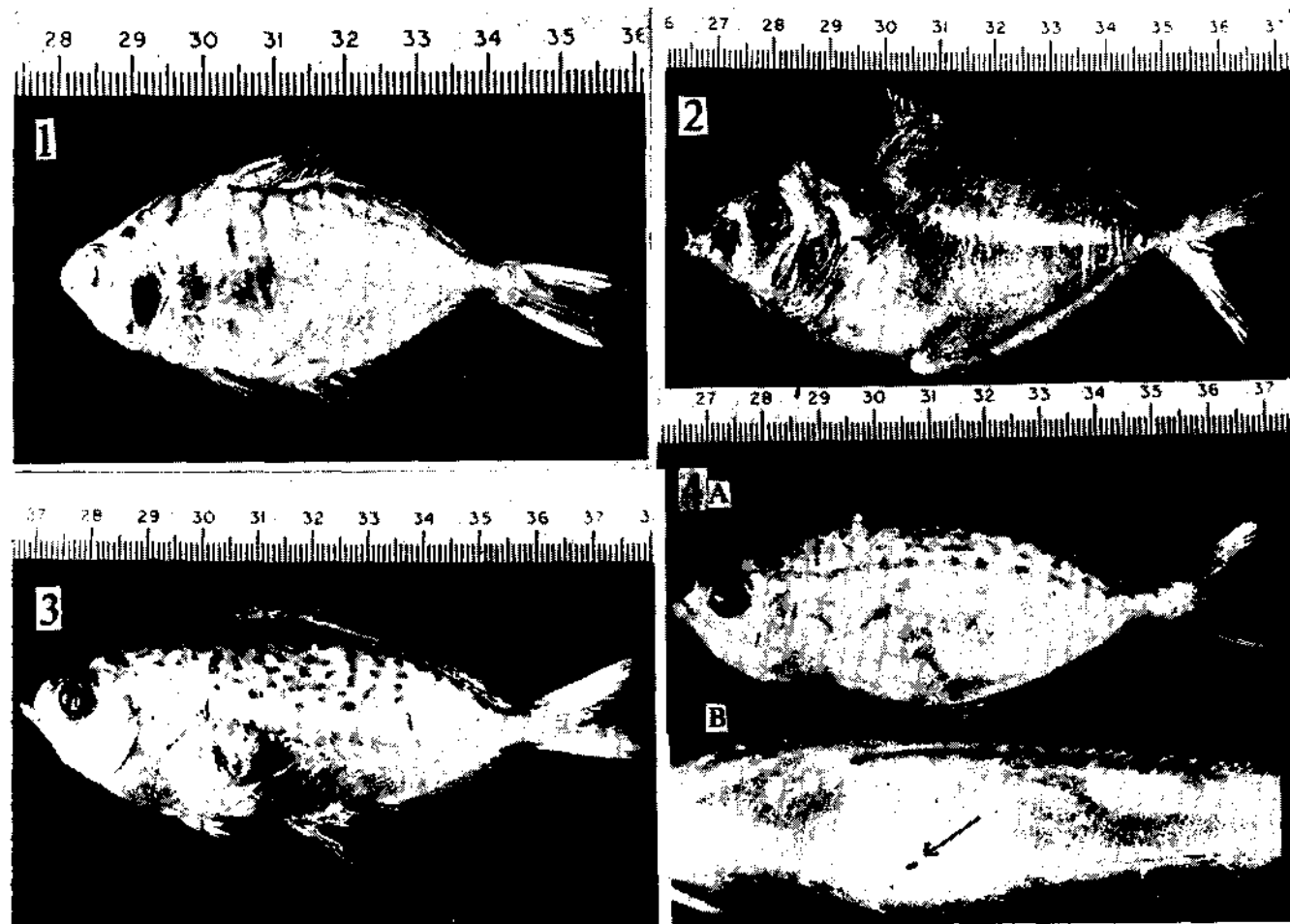


FIG. 1. *L. dussumieri*—concavity in spinous dorsal region. 2. *L. bindus*—bilobed appearance of ventral profile. 3. *L. leuctiscus*—concavity in soft anal region. 4A. *L. lineolatum*—concavity in ventral region and total absence of ventral fins. B. Enlarged ventral view (in part) of same to show absence of ventral fins which arise in front of vent (marked by arrow). (Photographs by Mr. S. P. D. Ghanshani).

REMARKS

Of the above mentioned anomalies, those in body shape and absence of spines or rays in fins or their unusual proportions are marked, more common than others and appear to have been brought about by injuries to the fish at some stage. As seen from earlier literature, in other groups of fishes also, the same anomalies appear to be more common. The instances of unusual body profile mentioned in the present account in different species indicate that such anomalies may occur at any region of the body and both on the dorsal and ventral sides. They are also likely to affect the fins in the neighbourhood. The significant anomalies reported in the

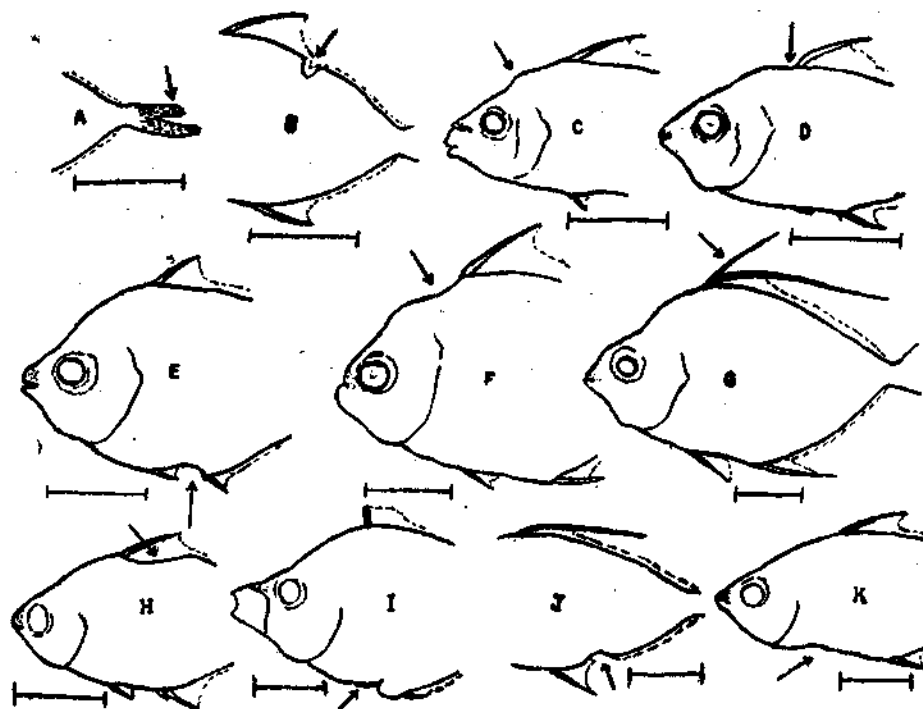


FIG. 1. A to K. Outline sketches of the species of *Leiognathus* shown in Plates I & II pointing out (by the arrow) the different anomalies. A to G correspond respectively to Figs. 1, 2, 4, 5, 6, 8 and 9 in Plate I and H, I, J, K, to figs. 1, 2, 3, 4 respectively in Plate II. Scale under all figs. 2 cm.

Leiognathus lincolatus

- A. Ventral view of specimen without ventral fins.
B. Ventral view of normal specimen with ventral fins.

present study are the unusually elongate first dorsal spine in *L. fasciatus*, the defect in the eye of *L. dussumieri*, the unusual black pigment in the upper caudal lobe of *Leiognathus*, the absence of first anal spine in *L. lincoltus* and the complete absence of ventral fins and their girdles in *L. berbis*. Complete absence of ventral fins along with their girdles in fishes appears a rather rare condition. Perusal of literature (Hora, 1921; Thompson and Adams, 1936; Dawson, 1964) indicates that this feature is found more in freshwater fishes than in marine species, anomalies of this nature having been regarded as congenital variations or result of accidental injuries.

TABLE I
Morphometric* and Meristic Data of Seven Species of *Leiognathus* showing Anomalies

S.No.	Character	<i>L. dussumieri</i>					<i>L. brevirostris</i>		
		1 9-3-65 Panaikulam (PB)	2 13-2-67 Vedalai (GM)	3 7-2-67 Mandapam (GM)	4 31-1-68 Pamban (GM)	5 20-5-67 Madras (BB)	6 29-7-67 Thangachi- madam (PB)	7 6-1-67 Mandapam (PB)	8 No data
	Anomaly	Small upper caudal lobe	Notch behind spinous dorsal	Defective left eye	Concavity in soft anal region	Concavity in spinous dorsal region	Supraoccipital region elevated	Notch before spinous dorsal	Supraoccipital elevated
1.	Standard length	53.0	63.0	63.5	85.0	65.5	65.0	64.0	44.5
2.	Fork length	65.0	68.0	71.0	92.0	72.0	68.0	69.0	50.0
3.	Total length	64.0	80.0	83.0	108.0	82.0	81.0	81.0	(57.0)
4.	Head length	17.0	20.0	21.0	27.5	20.5	20.0	21.0	15.0
5.	Depth	24.0	30.0	30.0	38.0	27.5	28.0	27.0	19.5
6.	Snout	5.0	7.0	7.0	10.0	7.0	7.0	7.0	4.5
7.	Eye diameter	5.5	7.0	7.0	8.0	6.0	7.0	7.0	5.0
8.	Interorbital space	6.0	7.0	7.0	9.0	6.5	7.0	6.0	5.0
9.	Pectoral length	12.5	15.5	16.0	20.0	15.0	14.5	13.0	10.5
10.	Ventral length	8.5	11.0	11.0	15.0	10.5	9.0	9.0	7.5
11.	Pre dorsal distance	24.0	29.0	29.0	38.0	20.8	30.0	28.5	20.0
12.	Dorsal spines-length :								
	First—	2.0	2.5	2.0	3.0	3.0	2.0	2.0	1.5
	Second—	(9.0)	15.5	(10.0)	(12.0)	(14.0)	15.0	13.5	10.0
	Third—	9.5	13.0	(11.0)	(11.5)	(12.0)	(11.0)	12.0	(6.0)
13.	Anal spines—length :								
	First—	2.0	3.0	3.5	3.5	3.5	3.5	3.5	2.5
	Second—	(7.5)	12.0	12.0	14.5	(10.5)	12.0	11.0	8.5
14.	Dorsal fin count	VIII, 16	VIII, 16	VIII, 16	VIII, 16	VIII, 16	VIII, 16	VIII, 16	VIII, 16
15.	Anal fin count	III, 14	III, 14	III, 14	III, 14	III, 14	III, 14	III, 14	III, 14
16.	Sex	Female	male	male	female	male	male	male	—

* Measurements in mm. ; Parentheses indicate incompleteness.

PB : Palk Bay ; GM : Gulf of Mannar ; BB : Bay of Bengal.

TABLE I (Contd.)
Morphometric* and Meristic Data of Seven Species of *Leiognathus* showing Anomalies

S. No.	Character	<i>L. bindus</i>		<i>Leiognathus</i> sp.				<i>L. fasciatus</i>	<i>L. leuciscus</i>	<i>L. lincolatus</i>
		9 Mandapam (GM)	10 31-1-68 Pamban (GM)	11 8-2-67 Mandapam (GM)	12 17-2-67 Mandapam (GM)	13 No data	14 6-5-68 Mandapam (PB)	15 6-7-67 Panai-kulam (PB)	16 28-3-68 Pudukmadam (GM)	17 12-4-68 Periapattanam (GM)
	Anomaly	Concavity between base of ventrals and anal, first anal spine absent	Ventral profile bilobed	Tips of eighth, ninth rays in upper caudal lobe black	Concavity in front of spinous dorsal	Concavity in soft anal region	Middle portions of 7, 8, 9th rays in upper caudal lobe black	Unusually elongate, filiform first dorsal spine	Concavity in soft anal region	Concavity in ventral fin region, ventrals with girdles absent
1.	Standard length	72.0	83.0	68.5	88.0	64.0	60.0	103.0	94.0	89.5
2.	Fork length	77.0	90.0	75.0	95.0	71.0	65.0	110.0	102.0	95.0
3.	Total length	92.0	107.0	88.0	(111.0)	(81.0)	77.0	135.0	(115.0)	111.0
4.	Head length	22.0	23.0	22.0	28.0	20.5	20.0	34.0	27.0	25.5
5.	Depth	37.0	42.0	33.0	49.5	34.0	30.5	55.0	35.0	34.5
6.	Snout	6.0	7.0	6.0	8.5	5.5	7.0	12.0	9.0	8.5
7.	Eye diameter	9.0	9.0	8.0	10.5	8.0	8.0	12.0	8.0	7.5
8.	Interorbital space	8.0	8.0	7.0	9.5	7.5	6.5	10.5	8.5	8.0
9.	Pectoral length	17.5	18.0	18.5	23.0	17.5	16.0	26.5	17.0	15.5
10.	Ventral length	8.5	8.0	11.0	12.0	10.0	9.0	16.0	12.0	Absent
11.	Pre dorsal distance	32.0	36.0	33.5	46.5	31.5	30.0	52.0	39.5	38.5
12.	Dorsal spines, length :									
	First—	2.0	3.0	2.5	4.0	3.0	2.5	25.0	2.0	2.0
	Second—	(9.0)	(7.0)	(13.0)	(17.5)	(10.5)	12.0	53.0	36.5	(19.0)
	Third—	(7.5)	(8.0)	12.5	15.5	(10.0)	11.0	21.0	18.5	(12.0)
13.	Anal spines, length :									
	First—	Absent	(2.0)	3.0	4.0	3.5	3.0	2.5	2.0	1.5
	Second—	(10.0)	(4.5)	13.0	16.0	12.0	11.0	(25.5)	15.5	(12.0)
14.	Dorsal fin count	VIII, 16	VIII, 16	VIII, 16	VIII, 16	VIII, 16	VIII, 16	VIII, 16	VIII, 16	VIII, 16
15.	Anal fin count	II, 14	III, 14	III, 14	III, 14	III, 11	III, 14	III, 14	III, 12	III, 14
16.	Sex	female	female	female	female	male	male	female	female	female

* Measurements in mm. ; Parentheses indicate incompleteness.

PB : Palk Bay ; GM : Gulf of Mannar.

In the present case of *L. lincolatus* since the area of origin of ventrals is deformed without trace of ventral fins or their girdles and with an unusual scale pattern in the region, the anomaly should be regarded as due to injury very early in development.

SUMMARY

Certain anomalies in body profile, fins, eye and colour of seventeen specimens belonging to seven species of fishes, namely, *Leiognathus dussumieri*, *L. brevirostris*, *L. bindus*, *Leiognathus L. fasciatus*, *L. leuciscus* and *L. lincolatus* are briefly described. Most of them, especially those related to body profile and fins, appear to be resultant of injuries. The significant anomalies reported in the present study are the unusually elongate first dorsal spine of *L. fasciatus*, the defect in the eye of *L. dussumieri*, the unusual black pigment in the upper caudal lobe of *Leiognathus*, the absence of first anal spine in *L. bindus* and the complete absence of ventral fins along with the pelvic girdles in *L. lincolatus*. The morphometric and meristic data of the seventeen specimens showing the anomalies are given.

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