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POPULATION STUDIES OF THREE SPECIES OF RIBBON FISHES OFF THE BOMBAY COAST

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ABSTRACT

Populations of three species of ribbonfishes, viz., *Trichiurus lepturus, Lepturacanthus savala, Euplerogrammus muticus* off the Bombay coast were studied for meristic and morphometric characters. All meristic characters except pectoral fin ray count, showed interspecific as well as intraspecific variations. Regression studies for various characters showed a linear relationship and high degree of correlation to the total and head lengths. Variations between the sexes were found insignificant. A comparison of the mean ratios of body parts of samples from Bombay and Mandapam showed significant variations for *L. savala* and *E.muticus*.

INTRODUCTION

The objective of population study is to determine whether a given species is comprised of an assemblage of homogenous or heterogenous groups of individuals. According to Ahlstrom (1957) "under conditions of partial or complete isolation of groups of fish, slight differences in body proportions or meristic characters will be preserved in each group. The small differences will not necessarily be apparent in individual specimens, but often only in an average of large number of specimens. The significance of the difference is appraised by means of statistical procedures based on the theory of probability"

In the present context the term 'population' denotes a particular group of individuals, which inhabit a given area of the sea at a certain time showing certain distinct morphometric characters. Populations are distinguished by variations in meristic counts and morphometric characters (Marr, 1955; Pillay, 1952; Ghosh *et al.*, 1968) as well as by biochemical genetics (Avise, 1974; Buth and Burr, 1978). Meristic counts and morphometric characters of three species of ribbonfishes namely *Trichiurus lepturus* Linnaeus (1758), *Lepturacanthus savala* Cuvier (1829) and *Euplerogrammus muticus* Gray (1831) were studied.

MATERIAL AND METHODS

Fishes for the present study were collected by the institute's vessels, 'M.V. Saraswati' and 'M.F.V. Narmada' during their cruises off Bombay, as well as from landing centres of Versova and Ferry Wharf at Bombay (July 1984 to June 1985). Meristic counts were taken for dorsal fin rays, pectoral fin rays, anal spinules, gill rakers, pyloric caecae and vertebrae. Vertebral count was taken after boiling the fishes for 10 minutes in freshwater and removing the muscles. Dorsal fin ray and anal spinule counts were taken for some specimens after staining them in alizarin. Regression studies were conducted in 572 specimens of *T.lepturus*, 94 specimens of *L.savala* and 120 specimens of *E.muticus*. The characters, predorsal length (PDL), snout-vent length (SVL), body depth (BD) and head length (HL) were regressed on total length (TL). Regression values for the characters postorbital length (POL), maxilla length (ML), snout length (SL), prenostril length (PNL), eye diameter (ED) and snoutwidth (SW) on head length (HL) were also estimated. Regression lines for PDL, SVL, BD and HL for males and females were plotted separately to find out any possible variations between the sexes. The significance of variations were assessed using Students T-test. Results obtained from the present study (Loc: Bombay) were compared with off Mandapam stock to find out any appreciable variations existing between the stocks of the two localities. Normal test of significance (Z test) was applied to find out the significance of the variations.

RESULTS AND DISCUSSION

Interspecific and intraspecific variations were observed for all the meristic characters studied except pectoral fin ray counts which remained constant (11) for all the speciments. The range, mode, standard error, mean and coefficient of variation for characters studied in the three species are presented in Table 1

The meristic characters studied showed slight variations between the sexes (Fig.1). At 5% probability level the variations were found insignificant, and hence, for the comparison of the remaining characters, sexes were not treated separately. All the characters studied showed a linear relationship and a high degree of corelation (r) to the total length and head length in both the sexes (Fig.1). Study of the relative growth of HL, PDL, BD, ED and ML in *T.lepturus*, *L.savala* and *E.muticus* revealed that the proportional length of head decreases with age in *E.muticus*, whereas it increases marginally at a slow rate, for *T.lepturus* and *L.savala* (Fig.2).

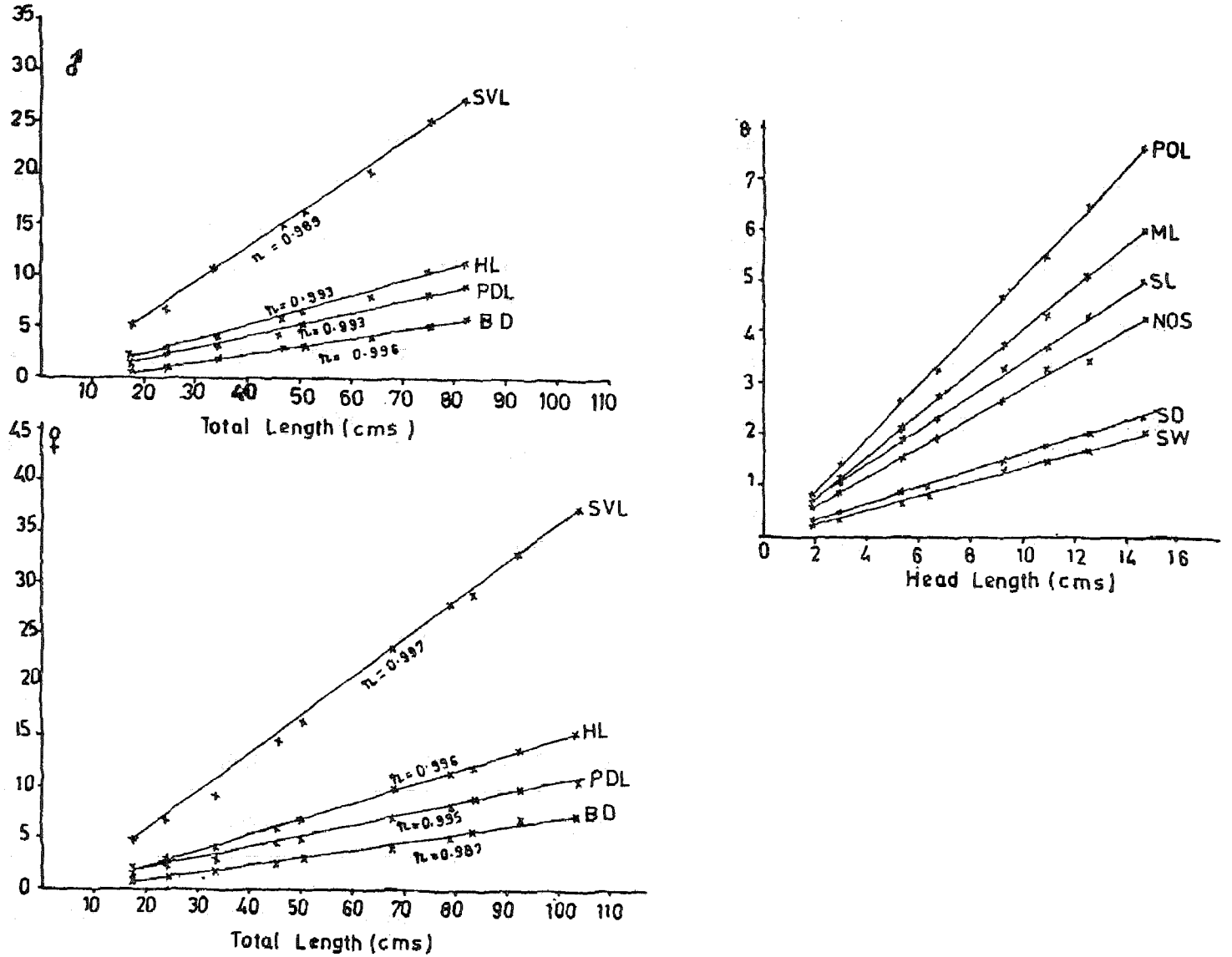

Fig. 1 : Relationship of various morphometric characters to the total length and head length in *T. lepturus*.

Table 1 : Meristic counts of the three species of ribbon fishes

Species	*T. lepturus*				*L.savala*				*E.muticus*			
Meristic characters	Range	Mode	Mean ± SE	CV	Range	Mode	Mean ± SE	CV	Range	Mode	Mean ± SE	CV
Gill rakers (Main series)	9-24	19	17.065 0.428	± 70.44	6-17	10	10.9 0.398	± 58.75	13-23	18	18.04	± 21.51
Dorsal fin ray	III	141 132-143	140.8 0.501	± 4.09	IV 105-122	177	117.4 1.33	± 11.62	III 137-149	147	146.25 0.444	± 3.32
Anal spinules	I + 1 107-171	151	143.3 17.28	±138.5	I + 1	86	82.28 2.87	± 3.49	I + 1 111+123	120	119.9 0.587	± 5.36
Pyloric caecae	22-38	23	25.3 0.45	± 1.78	12-18	16	15.13 0.115	± 12.62	4-12	11	9.24 0.174	± 38.09
Vertebrae	164-177	171	170.9 0.98	± 3.84	169-188	178	177.65 3.1	± 11.02	184-200	193	192.6 1.71	± 4.9

C.V. = Coefficient variation SE = Standard error

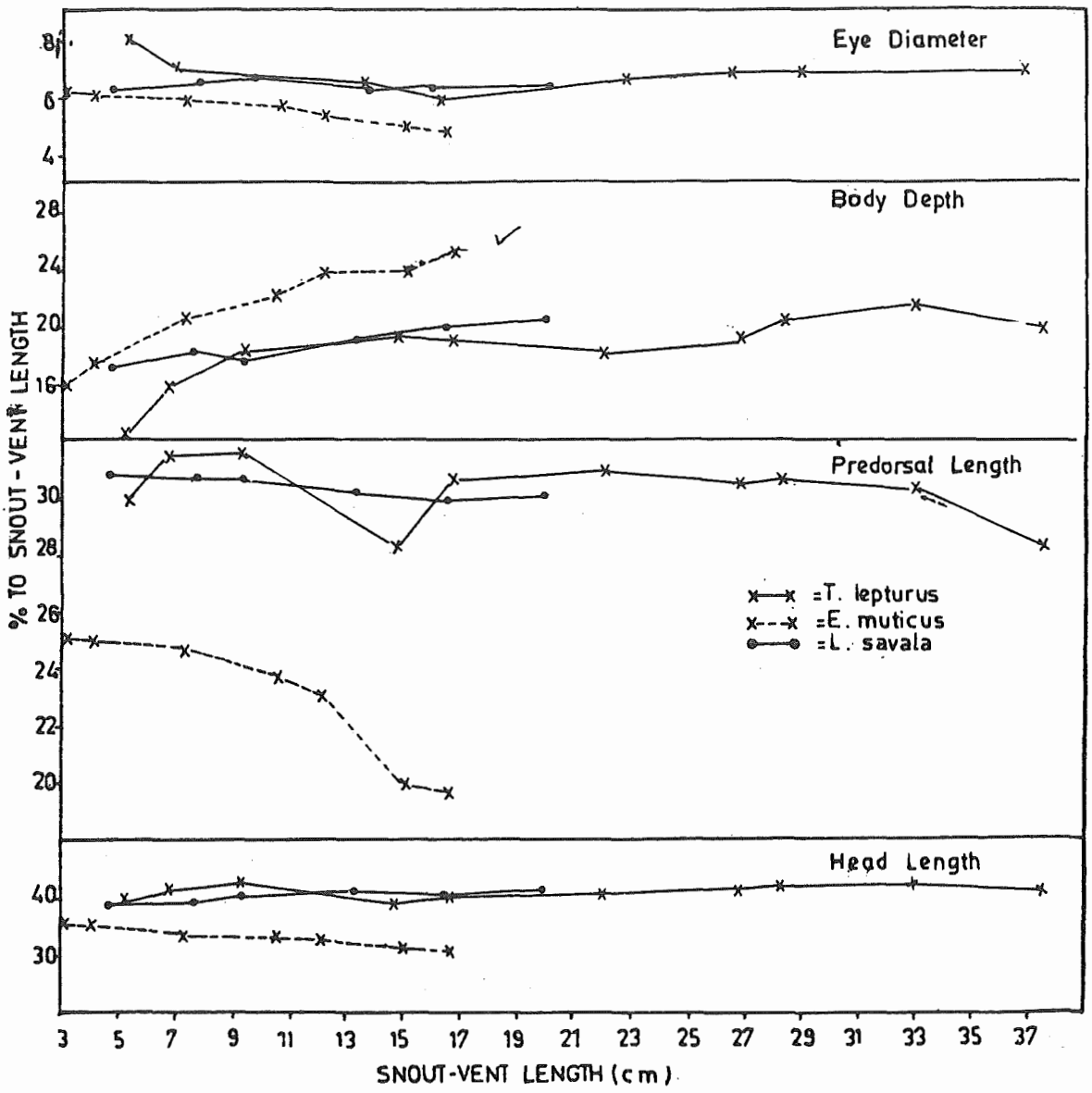

Fig. 2 : Relative growth of body parts to snout vent length in *T. lepturus, E. muticus* and *L. savala*

The proportion of predorsal length in *E.muticus* and *L.savala* was found to decrease at a decelerating rate with increase in body length whereas it ranged from 28.23 to 31.55 for *T.lepturus.*

The depth of body was found to increase rapidly with increase in SVL for all the species studied.

Table II : Body proportions of 3 species of ribbonfishes (represented as ratios to SVL) off Bombay and Mandapam coasts

Species		*T. lepturus*				*L.savala*				*E.muticus*			
Characters		N	Mean	± SE	Z	N	Mean	± SE	Z	N	Mean	± SE	Z
Head length	B	572	40.76	± 0.57	*1.15	94	40.6	± 0.05	3.95*	120	32.6	± 0.22	2.22*
	M	43	41.06	± 0.43		32	41.61	± 0.34		45	32.04	± 0.29	
Predorsal length	B	572	30.25	± 0.05	7.08*	94	31.85	± 0.27	8.64*	120	22.27	± 0.42	0.28
	M	43	20.65	± 0.27		32	29.5	± 0.26		43	22.2	± 0.16	
Body depth	B	572	18.62	± 0.09	0.2	94	18.63	± 0.13	5.99*	120	22.35	± 0.64	0.50
	M	43	18.50	± 0.82		33	20.14	± 0.30		45	22.18	± 0.37	
Eye diameter	B	408	6.72	± 0.01	* 1.52	94	6.41	± 0.003	0.69	120	5.38	± 0.02	3.77*
	M	43	1.11	± 0.16		32	1.13	± 0.2		45	4.92	± 0.08	

* = Significant at 5% probability level.

N = Number of specimens studied, B = Bombay, M = Mandapam, SE = Standard error

The proportion of eye diameter was found to be greater in young ones than the adults in all the three species. The ratio was found to decrease with age in *E.muticus*, but remained almost constant in the adults of *T.lepturus* and *L.savala*.

The proportion of maxilla length was found to decrease with increase in SVL for *E.muticus* and *L.savala* but fluctuated between 16.4 and 17.9 in *T.lepturus*.

A comparison of Bombay and Mandapam populations of *T.lepturus* showed significant variation in the mean ratio of predorsal length at 5% probability level (Table II). In *L. savala* the two populations were found to differ significantly in the mean ratios of head length, predorsal length and body depth (Table II). *E.muticus* from the two coasts were found to differ significantly in the mean ratios of their head length and eye diameter.

Thus it appears that separate geographical stocks of these species occur in Bombay and Mandapam. Occurrance of other stocks in different areas supporting local fisheries seems possible.

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