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Biometric characteristics of *Megalaspis cordyla* (Linnaeus, 1758) in the Chennai coastal waters, India

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Original Article

Abstract

The biometric characteristics of the horse mackerel, *Megalaspis cordyla* (Linnaeus, 1758) from the Chennai coastal waters, Southeastern India, were investigated to examine morphometric variation and to provide baseline biometric information for the species. A total of 411 specimens, ranging in total length from 16.6 to 43.6 cm and in weight from 42.0 to 630.0 g, were collected monthly between April 2023 and March 2024. Fifteen morphometric and seven meristic characters were measured and analysed using standard statistical methods. The coefficients of variation for morphometric traits ranged from 9.51% to 21.64%, while those for meristic traits ranged from 4.76% to 16.11%. Highly significant positive correlations ($p < 0.01$) were observed among key morphometric traits, particularly between total length and fork length, standard length, and snout to pelvic distance. In contrast, post-orbital length, snout length, and eye diameter exhibited relatively slower growth. The fin formula was observed to be: D_1 VII-VIII, D_2 I + 10–11, followed by 6–9 dorsal finlets; P 10-22, V I + 4–5, A I + 6-17, followed by 6–8 ventral finlets. Principal component analysis (PCA) was conducted on 15 allometrically size-corrected morphometric variables to identify the major contributors to morphological variation in *M. cordyla.* The first principal component (PC1) explained 29.53% of the total variance, with the highest loadings observed for TL, FL, and interdorsal space. The relatively narrow variation and strong interrelationships among morphometric characters indicated limited morphological variability among the sampled specimens. These findings provide baseline morphometric and meristic data for future comparative studies and may support further investigation on population structure and stock assessment of the species.

Keywords: *Morphometry, meristics, stock structure, fishery management, Chennai coast*

Introduction

Understanding the population structure of an exploited resource is a critical aspect of effective fisheries management. This information is particularly valuable for defining suitable conservation units and for estimating stock structure in multispecies fisheries. Fish stocks are typically distinguished by their structural and biological characteristics. The traits used to differentiate stocks may be influenced by genetic factors, environmental conditions, or both (Swain *et al.,* 2005).

Morphometric and meristic characters are frequently used to delineate the stocks of various exploited fish species (Murta, 2000; Silva, 2003; Turan, 2004). These characters are also useful for assessing the degree of differentiation and relationship among various taxa, as well as for describing their spatial distribution (Ihseen *et al.,* 1981). Morphometrics, which combines principles of geometry with biological study, provides valuable insights into the shape and structure of organisms (Bookstein, 1997). In fish, variations in morphometric traits often reflect differences in growth patterns and maturation rates, as body shape is closely linked to developmental processes. The adaptive changes, including phenotypic plasticity, may influence their external appearance, reproductive strategies, or survival, helping them cope with environmental challenges (Stearns, 1983; Meyer, 1987).

The meristic characters are widely used to assess the stock status of fish populations. Commonly recorded features include the number of spines and rays, gill rakers and scales. Meristic analysis has long been considered a fundamental approach for identifying fish stocks. Many species with multiple stocks, and

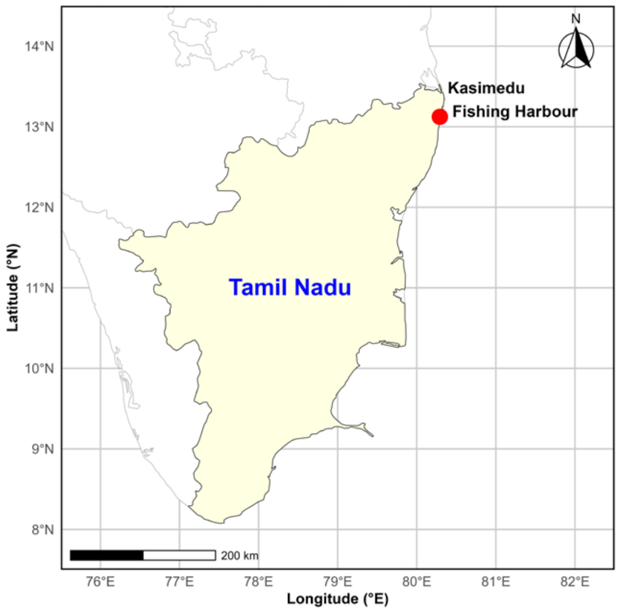

Fig. 1. Map showing the sampling location of Kasimedu fisheries harbour, Chennai coast

that are subject to fishery management, have received at least some level of meristic analysis (Waldman, 2005). Morphometric and meristic traits are often analysed together to gain a more comprehensive understanding of population structure.

The genus *Megalaspis* (Family: Carangidae) is monotypic, containing only a single species, *Megalaspis cordyla* (Linnaeus, 1758). It is a relatively large schooling species and is considered a high-quality table fish in the Indian pelagic fisheries sector. The species is primarily found in the Indo-Pacific region (Froese and Pauly, 2024). During the period 2020-21, *M. cordyla* contributed approximately 0.83 lakh tons to the total marine fish landings in India (DoF, 2022). Morphometric and meristic studies on the horse mackerel *M. cordyla* are limited, with only a few studies conducted in Indian waters (Jaiswar and Devaraj, 1989; Jaiswar and Acharya, 1991; Saker *et al.,* 2004; Sajina *et al.,* 2013). These studies were mainly conducted in other regions of India, and similar information from the Chennai coast along the southeastern Bay of Bengal remains limited. Therefore, the present study was conducted as a preliminary investigation to establish baseline morphometric and meristic data for *M. cordyla* from the Chennai coastal waters, Southeastern India.

Material and methods

A total of 411 specimens of *M. cordyla* were obtained through fishery-dependent sampling from the Kasimedu fish landing centre (13°07.32'N/80°17.49'E), located along the Chennai coastal waters (Fig. 1), during the period from April 2023 to March 2024. The lengths of the specimens ranged from 16.6 to 43.6 cm (25.0 ± 2.82 cm), and their weight ranged from 42.0 to 630.0 g (151.43 ± 59.50 g). The species was primarily caught in commercial trawl landings using various types of trawl nets with mesh sizes ranging from 20 to 30 mm. The total length of each individual was measured from the tip of the snout to the end of the tail to the nearest 0.1 mm, and the body weight was recorded using an electronic weighing balance with an accuracy of 0.01 g. A total of 15 morphometric (Fig. 2) and 07 meristic characters were examined following

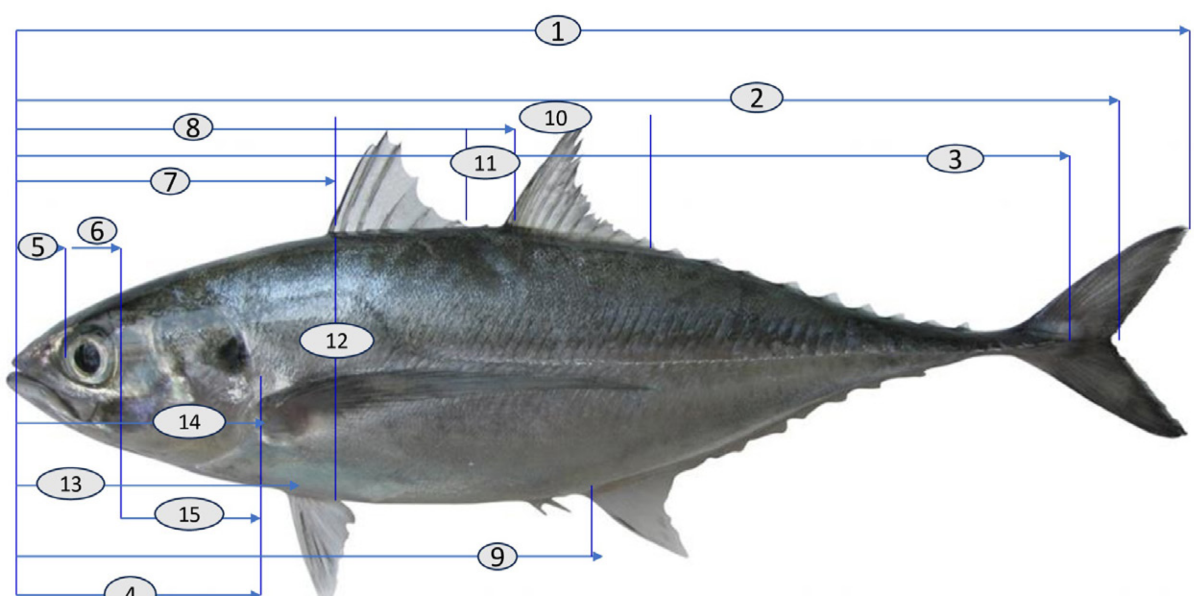

Fig. 2. Morphometric characters of *M. cordyla.* 1. Total length (TL), 2. Fork length (FL), 3. Standard length (SL), 4. Head length (HL), 5. Snout length (SnL), 6. Eye diameter (ED), 7. Snout to first dorsal, 8. Snout to second dorsal, 9. Snout to anal, 10. First dorsal to second dorsal, 11. Interdorsal space, 12. Body depth (BD), 13. Snout to pelvic, 14. Snout to pectoral, 15. Post-orbital length

the standard methodologies described by Laevastu (1965), Lowe-McConnel (1971), Dwivedi and Menezes (1974) and Grant and Spain (1977). To analyze the morphometric characters, scatter plots were generated to examine the relationships among variables, and linear regression equations of the form $Y = a + bX$ (where, Y is the dependent variable, X is the independent variable, a is the intercept, and b is the slope) were fitted using the least squares method, as outlined by Laevastu (1965) and Snedecor and Cochran (1967).

Meristic characters, such as the number of spines and soft rays on the dorsal, pectoral, pelvic, anal, and caudal fins, were recorded. These counts were performed using a magnifying lens and a fine needle to distinguish individual rays. Relationships between various morphometric traits and total length, as well as head length, were analysed. For both morphometric and meristic characters, descriptive statistics, including mean, range, standard deviation, standard error and coefficient of variation, were calculated.

To remove the effect of body size on morphometric characters, all measurements were standardised using the allometric adjustment method following Reist (1985); Quilang *et al.* (2007).

$$M_{adj} = logY - b\ (log\ X - log\ X_{STL})$$

Where, M_{adj} = size-adjusted morphometric measurement; Y = original unadjusted morphometric measurement; b = allometric coefficient (slope of the regression of log Y against log X); X = standard length of the specimen; X_{STL} = mean standard length of all specimens examined; *log* = base-10 logarithm.

After size correction, Principal Component Analysis (PCA) was applied to the size-adjusted morphometric data to identify the major contributors to morphological variation among specimens. PCA reduces multidimensional morphometric variables into a smaller number of independent components, thereby identifying the characters that contribute most to the observed variations (Konan *et al.,* 2010). All statistical analyses were performed using R version 4.3.2 (R Core Team, 2023).

Results

The morphometric study was carried out on 411 specimens of horse mackerel, *Megalaspis cordyla* collected from the Chennai coastal waters. The total length of the specimens ranged from 16.6 cm to 43.6 cm. Descriptive statistics, including mean, standard deviation, standard error and coefficient of variation, are presented in Table 1. The results showed that the highest coefficient of variation (%) was observed in snout length (21.64%), followed by interdorsal space (16.14%), snout to pectoral (12.18%), *etc.*

The simple linear regression equations are presented in Table 2. The highest regression coefficient ('b') value was observed for fork length (0.9073), followed by standard length (0.8298), snout length (0.4380), snout to anal (0.3974) and the

Table 1. Summary of descriptive statistics for the Morphometric measurements of *Megalaspis cordyla*

Morphometric characters	Range (cm)	Mean (cm)	SD	Standard error	CV (%)
Total length	16.6-43.6	25	2.82	0.15	11.27
Fork length	15.5-40.5	23.04	2.6	0.14	11.29
Standard length	13.5-37.3	20.84	2.4	0.13	11.53
Head length	3.7-9.2	5.54	0.57	0.03	10.35
Snout length	0.8-2.9	1.42	0.31	0.02	21.64
Eye diameter	0.7-2	1.16	0.14	0.01	12.34
Postorbital length	2.2-4.3	2.96	0.3	0.02	10.15
Snout to 1st Dorsal	4.4-12	6.76	0.83	0.04	12.26
Snout to 2nd dorsal	6.7-17.5	10.03	1.18	0.06	11.77
Snout to anal	6.8-18.4	10.63	1.26	0.07	11.83
1st dorsal to 2nd dorsal	2.4-6.2	3.46	0.43	0.02	12.34
Inter-dorsal space	0.4-1.6	0.79	0.13	0.01	16.14
Body depth	4.2-10	6.19	0.59	0.03	9.51
Snout to Pelvic	4.00-9.00	6.24	0.71	0.04	11.41
Snout to pectoral	3.8-9.5	5.55	0.68	0.04	12.18

Table 2. Linear regression values describing the relationship among different morphometric measurements of *M. cordyla*

Morphometric Characters	Equation	r	p-value
Fork length and total length	Y = 0.3570 + 0.9073X	0.967	<0.0001
Standard length and total length	Y = 0.0967 + 0.8298X	0.948	<0.0001
Head length and total length	Y = 0.9378 + 0.1840X	0.818	<0.0001
Snout length and total length	Y = -1.0639 + 0.0993X	0.831	<0.0001
Eye diameter and total length	Y = 0.0001 + 0.0462X	0.835	<0.0001
Snout 1stdorsal and total length	Y = -0.0184 + 0.2712X	0.85	<0.0001
Snout 2nd dorsal and total length	Y = 0.4785 + 0.3823X	0.832	<0.0001
Snout anal and total length	Y = 0.6915 + 0.3974X	0.794	<0.0001
1stdorsal to 2nd dorsal and total length	Y = 0.0252 + 0.1372X	0.823	<0.0001
Inter dorsal space and total length	Y = -0.3093 + 0.0441X	0.943	<0.0001
Body depth and total length	Y = 1.3606 + 0.1933X	0.856	<0.0001
Snout pelvic and total length	Y = 0.3205 + 0.2367X	0.878	<0.0001
Snout pectoral and total length	Y = -0.0405 + 0.2236X	0.87	<0.0001
Eye diameter and head length	Y = 0.0049 + 0.2078X	0.698	<0.0001
Snout length and head length	Y = -1.0067 + 0.4380X	0.669	<0.0001
Postorbital length and head length	Y = 1.0018 + 0.3541X	0.456	<0.0001

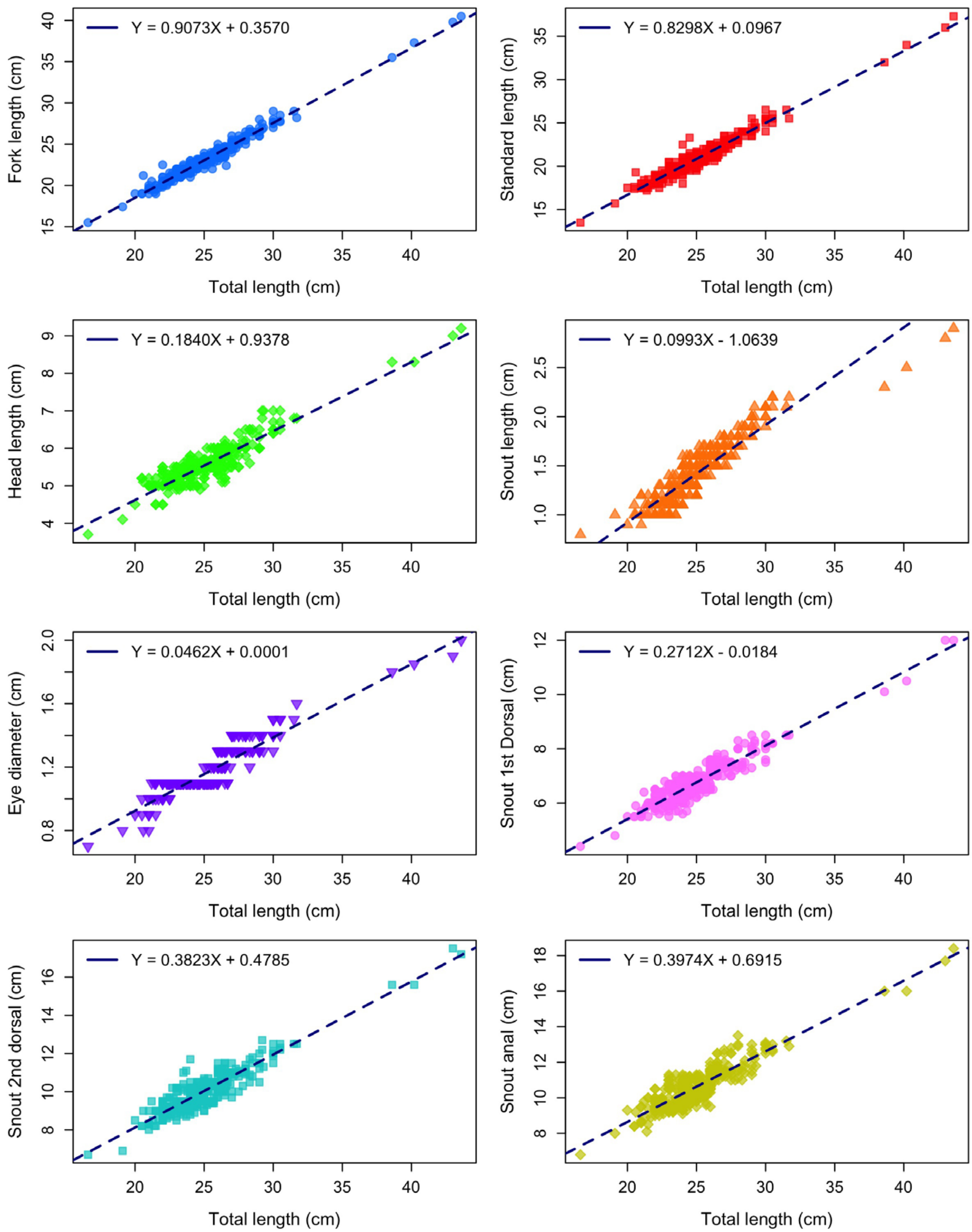

Fig. 3. Scatter plot showing the relationship between total length and different morphometric measurements of *M. cordyla*

lowest for interdorsal space (0.0441), when compared with total length (Fig. 3). Similarly, when morphometric characters compared against head length, the highest growth rate ('b') was observed in snout length (0.4380), followed by post-orbital length (0.3541) and eye-diameter (0.2078).

The correlation coefficient (r) values ranged from 0.456 to 0.967, indicating significant positive relationships among all morphometric characteristics of *M. cordyla* with total length ($p < 0.01$). The Pearson correlation matrix for the various morphometric measurements is presented in Table 3. Fork length exhibited the strongest correlation with total length (0.967), while post-orbital length showed the weakest correlation (0.456). In addition, the correlation of head length with other morphometric characters was highest with eye diameter (0.698) and lowest with post orbital length (0.456) (Fig. 4).

Principal component analysis (PCA) was performed on 15 size-corrected morphometric variables to identify the major contributors to morphological variations in *M. cordyla* (Table 4). The analysis produced 15 principal components, corresponding to the number of variables included in the dataset. Among these, the first three principal components together explained 55.4% of the total variance. The first principal component (PC1) accounted for 29.53% of the total variance and showed the highest loadings for TL, FL, and interdorsal space. Similarly, the second principal component (PC2) explained 16.0% of the total variance, with the highest loadings for snout to anal, 1st dorsal to anal, and 2nd dorsal to anal distances. The third principal component (PC3) accounted for 9.9% of the total variance and was mainly associated with snout length, the distance from the snout to the first dorsal fin, and the distance from the snout to the second dorsal fin. The relatively lower contributions of PC2 and PC3 compared to PC1 suggest that

Table 4. Component loadings of the first three principal components for morphometric measurements of *M. cordyla* from Chennai coastal waters

Character/Variable	Load value		
	PC1	PC2	PC3
Total Length	-0.412*	0.147	0.216
Fork length	-0.317*	0.065	0.052
Snout Length	-0.201	0.194	0.300*
Eye diameter	-0.225	-0.034	-0.100
Head Length	-0.118	0.190	0.010
Snout to 1st dorsal	-0.295	-0.146	-0.426*
Snout to 2nd dorsal	-0.281	-0.091	-0.543*
Snout to anal	-0.252	-0.430*	-0.163
1st dorsal to 2nd dorsal	-0.222	-0.027	0.053
1st dorsal to anal	-0.103	-0.543*	0.275
2nd dorsal to anal	-0.060	-0.561*	0.279
Inter dorsal space	-0.332*	0.177	0.242
Body depth	-0.265	-0.004	0.189
Snout to pelvic	-0.296	0.139	0.176
Snout to pectoral	-0.252	0.155	-0.257
Eigen values	4.430	2.396	1.486
Contribution rate (%)	29.53	15.97	9.91
Cumulative contribution rate (%)	29.53	45.50	55.41

Table 3. Pearson's correlation matrix showing relationships among different morphometric measurements of *M. cordyla*

	TL	Wt	FL	SL	SnL	ED	HL	Sn.1D	Sn.2D	Sn.A	X1D.2D	IDS	BD	Sn.Pel	Sn.pec	POL
TL	1	0.937 **	0.983 **	0.973 **	0.658 **	0.582 **	0.867 **	0.884 **	0.911 **	0.854 **	0.844 **	0.406 **	0.768 **	0.815 **	0.831 **	0.376 **
Wt	-	1	0.948 **	0.942 **	0.63 **	0.544 **	0.856 **	0.857 **	0.886 **	0.841 **	0.825 **	0.437 **	0.774 **	0.792**	0.82 **	0.467 *
FL			1	0.985 **	0.658 **	0.575 **	0.87 **	0.89 **	0.914 **	0.861 **	0.847 **	0.422 **	0.775 **	0.829 **	0.842 **	0.407 *
SL				1	0.649 **	0.566 **	0.87 **	0.881**	0.905 **	0.854 **	0.838 **	0.424 **	0.77 **	0.825 **	0.834 **	0.407 *
SnL					1	0.372 **	0.657 **	0.626**	0.588 **	0.551 **	0.574 **	0.277 **	0.508 **	0.592 **	0.608 **	0.323 **
ED						1	0.436 **	0.539**	0.538 **	0.577 **	0.558 **	0.393 **	0.505 **	0.454 **	0.479 **	0.13 *
HL							1	0.794**	0.814 **	0.747 **	0.774 **	0.291 **	0.704 **	0.742 **	0.75 **	0.667 **
Sn.1D								1	0.947 **	0.88 **	0.778 **	0.405 **	0.782 **	0.833 **	0.833 **	0.351**
Sn.2D									1	0.899 **	0.815 **	0.376 **	0.765 **	0.856 **	0.866 **	0.37 **
Sn.A										1	0.766 **	0.555 **	0.811 **	0.775 **	0.776 **	0.325 **
X1D.2D											1	0.432 **	0.683 **	0.74 **	0.754 **	0.395 **
IDS												1	0.477 **	0.334 **	0.346 **	0.102 -
BD													1	0.702 **	0.723 **	0.359 **
Sn.Pel														1	0.946 **	0.34 **
Sn.pec															1	0.334 **
POL																1

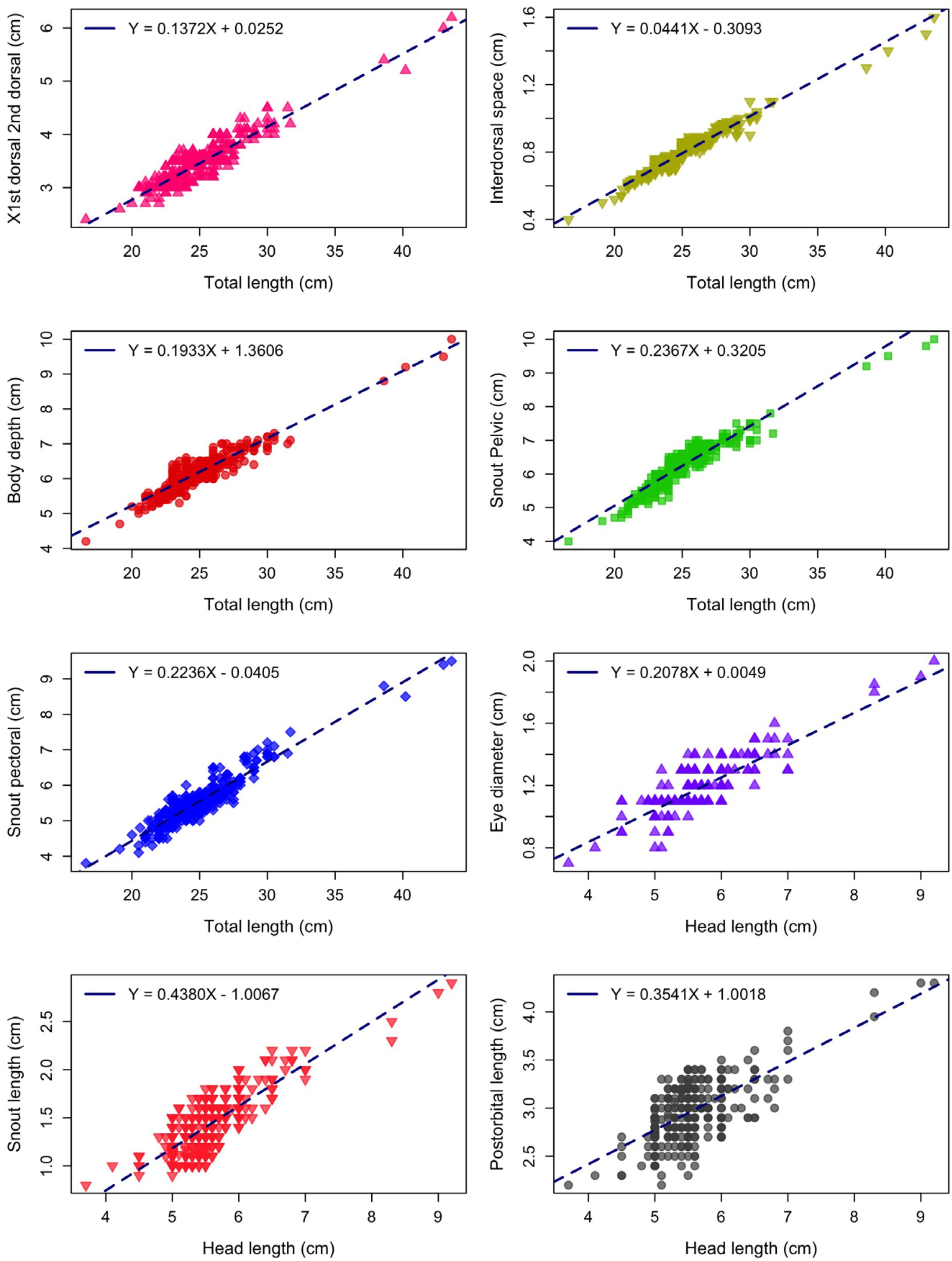

Fig. 4. Scatter plot showing the relationship between total length and different morphometric measurements of *M. cordyla*

these components represent minor morphological differences. Conversely, PC1 reflects the primary morphological gradient and predominantly illustrates the overall body-shape trend in *M. cordyla*.

The PCA based cluster analysis indicated the presence of three different morphometric groups within the *M. cordyla* population, reflecting variation in body elongation, trunk structure, and fin positioning (Fig. 5). The first cluster comprised individuals with intermediate body proportions, the second cluster consisted of more elongated individual with higher PC1 scores, and the third cluster included fish with lower PC2 values, indicating differences in trunk and ventral body proportions. The partial overlap observed among the clusters suggests that these groups represent natural morphological variability within the population rather than completely distinct morphotypes.

The range, mean, mode, median, standard deviation, standard error and coefficient of variation for various meristic characters are shown in Table 5. It was observed that the first dorsal fin has 7 to 8 spines, while the second dorsal fin has 01 spine followed by 10-11 soft rays. The pectoral fin possesses branched fin rays ranging from 10 to 22. The pelvic fin contains 01 spine and 4-5 soft rays, and dorsal finlets ranged from 6 to 9; ventral finlets ranged from 6 to 8. The coefficient of variation was highest in anal fin rays (16.11%), followed by ventral finlets (11.91%), pelvic fin rays (11.11%) and was lowest in second dorsal spines and rays (4.76%).

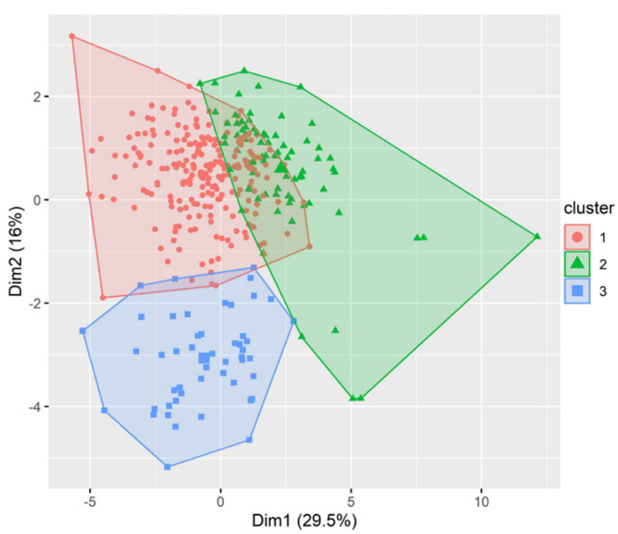

Fig. 5. The first and second principal component clusters of *M. cordyla* populations

Table 5. Statistical summary of meristic characters recorded for *M. cordyla*

Meristic characters	Range		Mean	Median	Mode	SD	SE	CV (%)
	Min	Max						
First dorsal fin spines	7.0	8.0	7.50	7.50	7.0	0.50	0.029	6.67
Second dorsal spines & rays	10.0	11.0	10.50	10.50	10.0	0.50	0.029	4.76
Pectoral fin rays	10.0	22.0	21.34	21.00	21.0	1.09	0.06	5.13
Pelvic fin rays	4.00	5.00	4.50	4.50	4.00	0.50	0.029	11.11
Anal fin rays	6.00	17.0	10.12	10.00	10.0	1.63	0.082	16.11
Dorsal finlets	6.00	9.00	7.91	8.00	8.00	0.47	0.03	5.99
Ventral finlets	6.00	8.00	7.35	7.00	7.00	0.87	0.05	11.91

Discussion

Fish morphometric studies are essential for accurate species identification and help in delineating different stock structures. In this study, the maximum size of *M. cordyla* was found to be 43.6 cm, which exceeds the maximum sizes reported in several earlier studies but is lower than the recorded 69.0 cm from the Gulf of Aden and the Red Sea (Al Sakaff and Esseen, 1999). However, the validity of this 69.0 cm record is doubtful. Conversely, Jaiswar and Devaraj (1989) reported a maximum length of 41.8 cm from the Northwest coast of India, while Sajina *et al.* (2013) observed a maximum size of 39.7 cm along the Indian coast, both comparable to the present study. Additionally, Sarmin *et al.* (2022) reported a maximum size of 36.5 cm for this fish from Bangladesh.

A comparison of morphometric measurements observed in the present study with those reported by Sajina *et al.* (2013) showed that the total length (TL) ranged from 16.3 to 39.7 cm, with specimens from the Mandapam region attaining a maximum TL of 31.6 cm. In contrast, the present study recorded a wider TL range of 16.0-43.6 cm, indicating the presence of larger individuals in the sampled population. Differences were also noticed in several morphometric characters. Sajina *et al.* (2013) reported eye diameter ranging from 0.81-1.50 cm for east coast specimens, whereas the present study recorded a slightly wider range of 0.7-2.0 cm. Further, head length reported by Sajina *et al.* (2013) ranged from 3.53-7.65 cm, while the present study reported higher values ranging from 9.2-9.7 cm. Similarly, the maximum body depth in Sajina *et al.* (2013) varied from 3.64 to 8.20 cm, whereas the present study recorded slightly higher values ranging between 4.2 and 10.0 cm.

The relatively higher morphometric ranges observed in the present study may primarily reflect the larger body size of the specimens examined, as morphometric measurements generally increase proportionally with the growth of the organisms (Froese, 2006). Such variations may be attributed to ecological conditions, food availability, prey density, and environmental characteristics along different coastal regions, which can contribute to phenotype plasticity in fish populations (Swain and Foote, 1999). Although Sajina *et al.* (2013) reported clear morphological separation between Mandapam populations and those from the northeast and west coasts, the morphometric ranges observed in the present study broadly overlap with the east coast population described in their study. This suggests that the populations along the southeast coast share similar morphological characteristics, while minor variations may occur due to geographic and environmental influences, as well as differences in the size composition of the sampled individuals.

A highly significant positive correlation among the various morphometric characters of *M. cordyla* was observed in the present study. The regression slope values ('b') reflected proportional growth relationships among the morphometric measurements with increasing body size. Among the characters analysed, fork length, standard length, inter-dorsal space, and snout to pelvic length exhibited a very strong positive correlation with total length. In contrast, post-orbital length, snout length and eye diameter showed comparatively lower growth rates, suggesting relatively slower development of these features compared to other morphometric traits.

Sarmin *et al.* (2022) reported a high degree of correlation between standard length and fork length of *M. cordyla* in the Bay of Bengal, Bangladesh. Similar results were also reported from the Northwest coast of India by Jaiswar and Devaraj (1989), who found the highest degree of correlation between standard length and fork length in their study. The present study supports the earlier findings from Bay of Bengal and the Northwest coast of India.

The growth rates of other morphometric characters, such as snout to pelvic, snout to dorsal, snout to anal and body depth, in relation to per unit change in total length, as well as post orbital length, snout length and eye diameter in relation to per unit change in head length, were faster than those of other compared characters for the species. Similar growth patterns have been reported by several researchers in Indian waters, including Poojary and Sundaram (2014) in *Decapterus russelli,* Bhendarkar *et al.* (2014) in *Rastrelliger kanagurta.* Sajana and Bijoy Nandan (2017) in *Alepes djedaba,* Masood *et al.* (2022) in *Alepes vari.*

The present study observed differences in growth patterns among the morphometric characters, which may reflect functional adaptations closely related to the body form and swimming behaviour of *Megalaspis cordyla*. The relatively faster growth of characters such as snout to pelvic, snout to dorsal, snout to anal distance, and body depth with increasing total length may contribute to maintaining body balance and stability during active swimming. In pelagic fishes, the relative positioning of fins and body depth plays an important role in hydrodynamic efficiency and manoeuvrability in open-water environments (Blake, 2004). In contrast, the comparatively slower growth of characters, including post-orbital length, snout length, and eye diameter relative to head length, suggests that these sensory structures develop early and remain proportionally stable as the fish grows. Such growth patterns may help maintain functional efficiency in feeding and visual detection while supporting the streamlined body form characteristic of fast-swimming carangid fishes (Queiroz *et al.*, 2018).

Meristic counts of *M. cordyla* were compared with data from previous studies (Day, 1878; Jaiswar and Devaraj, 1989; Saker *et al.,* 2004; Sarmin *et al.,* 2022), and they are in close agreement with most of the earlier findings presented in Table 6. In the present study, the number of first dorsal spines and the second dorsal spine and rays in *M. cordyla* varied from VII to VIII and I + 10-11,

Table 6. Comparison of meristic characters of *M. cordyla* based on previous studies

Authors	First dorsal spines	Second dorsal spines & rays	Pectoral fin spines & rays	Pelvic fin spines & rays	Anal fin spines & rays	No. of finlets
Day (1878)	6-8	9–11	21	5	8–9	8–10
Weber and Beaufort (1931)	8	10–11	—	5	8–10	7–9
Bal and Rao (1984)	8	10–11	—	—	8–10	7–9
Jaiswar and Devaraj (1989)	8	11–13	19–22	5	9–11	6–9
FAO/SIDP (2000)	8	I+18–20	—	I+5	I+16–17	Dorsal: 7–9| Anal: 8
Saker *et al.* (2004)	8	I+9–14	I+19–20	I+5	I+9–11	5–9
Sajina *et al.* (2013)	8	I+14–18	21–25	I+5	II+I+12–16	Dorsal: 6–8 Anal: 5–7
Habib *et al.* (2017)	8	I+VII; I/11	20–26	I+5	II+I/10	Dorsal: 8 Anal: 6
Hossain *et al.* (2020)	8	VIII; I/18–20	22	I+5	II+I/16–17	Dorsal: 7–9 Anal: 8–10
Sarmin *et al.* (2022)	8	I+14–18	20–26	I+5	II+I+12–16	Dorsal: 6–8 Anal: 5–7
Present study	7-8	I+10–11	10–22	I+4–5	I+6-17	Dorsal: 6–9 Ventral: 6–8

respectively. These findings are largely consistent with previous literature. Day (1878) reported 6-8 first dorsal spines and 9-11 soft rays in the second dorsal fin, while Weber and Beaufort (1931) recorded 8 first dorsal spines and 10-11 soft rays. Bal and Rao (1984) also reported the same findings: 8 first dorsal spines and 11-13 rays, and Saker *et al.* (2004) documented 8 spines and I + 9-14 rays. The FAO/SIDP (2000) described 8 first dorsal spines and I + 18-20 rays. Later studies (Sajina *et al.,* 2013; Habib *et al.,* 2017; Hossain *et al.,* 2020; and Sarmin *et al.,* 2022) provided more detailed accounts of the first and dorsal fin formula, like this: I + 14-18 and I/18-20. In terms of pectoral fin ray count, the present study recorded 10-22 branched rays, aligning closely with the range of 19-26 rays reported in other studies (Jaiswar and Devaraj, 1989; Sarmin *et al.,* 2022). Pelvic fin counts in the present study were I + 4–5, which corresponds with the widely reported value of I + 5 in the previous studies. Anal fin spines and rays ranged from I + 6–17 in the present observation, which falls within the ranges reported in earlier studies: I + 9–11 (Saker *et al.,* 2004) and II + I + 12–16 (Sarmin *et al.,* 2022). The number of finlets in the present study ranged from 6 to 9 dorsally and 6 to 8 ventrally, which closely agrees with earlier studies. Furthermore, the maximum number of meristic counts observed in the present study was generally similar to previous findings, with minor differences noticed in the second dorsal spine rays and anal fin spine rays. These variations could be attributed to various environmental parameters such as temperature, salinity, dissolved oxygen, pH, food availability, and the overall growth condition of the species (Barlow, 1961; Lindsey, 1988). The findings of the present study provide baseline morphometric and meristic data on *M. cordyla* from the Chennai coastal waters. The results contribute to understanding morphological variation in the species and may serve as useful reference data for future comparative studies across different geographical regions and broader investigation of the species.

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Author contributions

Conceptualization: KS; Data curation: KS; Formal analysis: KS; Investigation: KS; Methodology: KS; Software: KS; Writing – original draft: KS; Writing – review and editing: RJ; Writing– review and editing: AT; Supervision: AT; Writing–review and editing: YT; Supervision: KR; Editing: KR.

Data availability

The data are available and can be requested from the corresponding author.

Conflicts of interest

There is no conflict of interest among the authors.

Ethical statement

No live fish were harmed during the study.

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