

Understanding the fishery dynamics and stock health of mahi-mahi *Coryphaena hippurus* (Linnaeus, 1758) from Indian coastal waters

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Abstract

This work delves into the mahi-mahi (dolphinfish) fishery along the Indian coast, noting its developmental stage precluding a full assessment. The analysis of population characteristics highlights their inherent resilience, driven by early maturity, substantial fecundity and rapid growth rates. These traits collectively mitigate susceptibility to fishing pressure, ensuring the maintenance of sizable spawning stock biomasses and recruitment. Through Kobe analysis, it is determined that the present fishing mortality and biomass levels remain within safe thresholds, indicating absence of overfishing. However, regular monitoring is imperative to swiftly implement management measures if necessary, safeguarding the sustainability of the mahi-mahi fishery in the long term.

Introduction

Dolphinfishes, members of the family Coryphaenidae, of the order Carangiformes are highly migratory, fast-moving, oceanic pelagic fishes with worldwide distribution in tropical and subtropical waters of the Atlantic, Indian and Pacific oceans (Gibbs and Collette, 1959; Massuti *et al.*, 1998; Merten *et al.*, 2014; Guzman *et al.*, 2015). *Coryphaena* is the only genus under the family Coryphaenidae, with two species viz., *Coryphaena hippurus* Linnaeus, 1758 (common dolphinfish) and *Coryphaena equiselis* Linnaeus, 1758 (pompano dolphinfish) (Gibbs and Collette, 1959) and are commonly called as mahi-mahi or dolphinfishes. They are found in extensive areas of the world's oceans, enjoying a wide distribution in tropical and subtropical waters of the Atlantic, Indian and Pacific Oceans (Merten *et al.*, 2014; Gatt *et al.*, 2015). Dolphinfishes are relatively fast-growing oceanic species and undertake seasonal migrations to warm areas with temperatures 28°C or above (Palko *et al.*, 1982). They

mostly occur in the same area as other large pelagic fishes and support fishery in several regions (Lasso and Zapata, 1999; Olson and Galvan-Magana, 2002). The species is also ecologically important as an apex predator in the pelagic niche and feeds on fishes, crustaceans and molluscs (Varghese *et al.*, 2013; Guzman *et al.*, 2015). Globally, dolphinfishes were harvested substantially, especially during the last few decades and the catch increased 10 folds from 0.01 million t in the 1950s to 0.1 million t in 2018 (Molto *et al.*, 2020). They are usually caught by troll lines, long lines, gillnets, and occasionally by purse seines (Collette, 1999). The remarkable fast growth rate and high turnover of this species may make the dolphinfish less susceptible to overfishing as compared to other long-lived slow-maturing fishes. Though they are not currently considered endangered or threatened species, management measures are needed to help the conservation of this valuable resource and sustain its production. Fish stock assessment is the first step to determining the level of



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exploitation required to get sustainable yields from the concerned resources (Sparre and Venema, 1998). Effective management of any fishery requires considerable knowledge regarding population characteristics to make quantitative predictions about the reactions of fish populations to alternative management choices (Hilborn and Walters, 1992).

In India, dolphinfish resource constitutes a significant portion of fish landings in Gujarat, Daman and Diu, Kerala and Tamil Nadu. However, there is a dearth of information regarding their population characteristics along the Indian coast. Previous studies have explored the fishery, diet composition and reproductive biology of *C. hippurus* (Linnaeus, 1758) in various regions such as the Eastern Arabian Sea (Varghese *et al.*, 2013), Karnataka coast (Rajesh *et al.*, 2016; Assana *et al.*, 2021), west coast of India (Kumar *et al.*, 2017) and Saurashtra coast (Saroj *et al.*, 2018a). Additionally, research has been conducted on the length-weight relationship of *C. hippurus* and *C. equiselis* by Retheesh *et al.* (2021) and Assana *et al.* (2020); GIS-based mapping of *C. hippurus* along the Saurashtra coast by Saroj *et al.*, (2018b) and the stock status of the species in Indian waters by Manjusha *et al.* (2012) and from the Kerala coast by Benjamin and Kurup (2012). This study focuses on analysing data about the fishery and stock characteristics of common dolphinfish (*C. hippurus*) along the entire Indian coast.

Materials and methods

The fishery and biology of *C. hippurus* landed along the Indian coast was monitored from 2012 to 2020 and data were analysed to understand stock health. The baseline data on the catch and effort of dolphinfish, available from ICAR-Central Marine Fisheries Research Institute (ICAR-CMFRI), were utilised for analysis. The characters detailed for differentiating the two known species of dolphinfish by Palko *et al.* (1982) were employed for species identification. Regular weekly observations were conducted at major landing centres along the Indian coast for mahi-mahi fishery and biological data collection. The minimum size at which females became sexually mature (L_{min}) was recorded and a logistic regression model was utilised to calculate the fork length (FL) at which 50% (L_{m50}) of females were mature:

$$P = 100 / [1 + \exp(-r(L - L_m))]$$

where P is the percentage of mature fish on length-class L, r is the width of the maturity curve and L_m is the length at 50% maturity, by the method of maximum likelihood (King, 1995).

Fecundity was calculated by the gravimetric method (Hunter and Macewicz, 1985). Growth parameters such as asymptotic length (L_{∞}) and growth coefficient (K) were estimated using the ELEFAN I module of FISAT software and the Powell-Wetherall plot (Gayanilo *et al.*, 2005) using length frequency data collected over the period. The growth estimates were validated using the growth inscriptions on their sagittal otoliths as in Abdussamad *et al.* (2022). The age at length data derived from otolith analysis was fitted to a linear ($Y = a + bX$) model for deriving the growth coefficient. This new growth coefficient was substituted in all further stock assessment works using length frequency data. Length-weight relationships (LWRs) of fishes were calculated by cube law, separately for male and female fishes. Le Cren (1951) modified the cube law as $W = aL^b$, where W = weight of fish in grams, L = fork length of fish in centimetres and

'a' the exponent describing the rate of change of weight with length. The probability of capture and length at first capture (L_{c50}) were estimated as in Pauly (1983) and the age at zero length (t_0) from Pauly's empirical equation. Natural mortality (M) was calculated by Pauly's empirical formula (Pauly, 1983) and total mortality (Z) from the length-converted catch curve (Pauly, 1983). Longevity was estimated as $t_{max} = 3/K + t_0$ (Pauly, 1983). Length-structured virtual population analysis (VPA) was used to obtain fishing mortalities at each step of their growth. The relative yield per recruit (Y/R) and biomass per recruit (B/R) at different levels of F were estimated using Beverton and Holt model (Beverton and Holt, 1957; Gayanilo *et al.*, 2005). The length-based Thompson and Bell model by Pauly (1983) was used to predict catches and stock sizes under given assumptions on future exploitation levels.

Kobe plot serves as a visual tool for determining the stock status of a fishery, widely recognised for its practical and user-friendly approach to presenting stock status information (Maunder and Aires-da-Silva, 2011). It is divided into four panels, each corresponding to different stock conditions: Red for overfishing and population depletion, Orange for sustainability with efforts to rebuild depleted stocks, Yellow for sustainable populations with signs of overfishing and Green for healthy stocks with potential for increased yield. The plot positions points based on the ratio of fishing (F) to estimated stock abundance (B), providing a clear indication of the stock's status relative to maximum sustainable yield (MSY) reference points. Stock abundance (Biomass, B or Spawning stock biomass, SSB) is typically plotted on the X-axis, while fishing mortality is plotted on the Y-axis, allowing stakeholders to quickly assess the fishery's status and inform management decisions. The Kobe plot was used here to determine the stock status of the dolphinfish stock along the Indian coast.

Results

Fishery of dolphinfish

Annual landings of dolphinfish along the Indian coast (2007-2020) exhibited an increasing trend over the last decade, reaching a peak of 10,763 t in 2018, followed by 10,754 t in 2017 and a minimum of 3,780 t in 2009 (Fig. 1). The estimated annual average landing during 2007-2020 was 6,592±2750 t. The declines in landings observed in 2019 and 2020 were attributed to reduced fishing

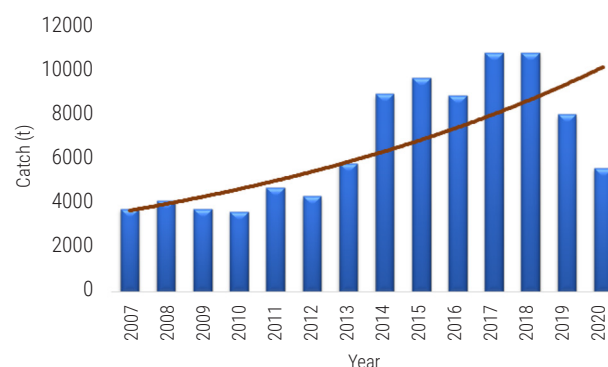


Fig. 1. Annual average dolphin fish landings along the Indian coast during 2007-2020

effort following natural calamities and the pandemic. The fishery was supported by *C. hippurus* and *C. equiselis*, with the former contributing a major share of 7,966 t and the latter forming 84 t. *C. hippurus* recorded a peak landing during 2017 at 10,705 t, followed by 10,364 t in 2018 and the lowest in 2010 with 3,600 t. *C. equiselis* landing peaked at 400 t in 2018. They formed a fishery all along the coast, with a maximum share from Gujarat (33.25%), followed by Kerala (25.38%), Daman and Diu (10.99%), Tamil Nadu (10.04%), Maharashtra (8%) and Andhra Pradesh (7.27%) (Fig. 2). The majority of dolphinfish landings were made by multiday trawlers and other mechanised fleets (42%), which operate troll lines, hand lines and gillnets during voyages or mooring times, followed by outboard gillnet units (22%), mechanised gillnet units (22%) and outboard hook and line units (14%).

Population characteristics of dolphinfish

The fishery was sustained by dolphinfish ranging from 28 to 164 cm FL throughout the study period, with mean sizes fluctuating between 76.5 and 89.9 cm (Fig. 3). They exhibited increased vulnerability to major gears (gillnets/hooks and lines) at a size of 56.5 cm ($L_{c_{50}}$) and above, with proportions ranging between 56.5 and 70.5 cm during different years of the study. Growth parameters; asymptotic length (L_{∞}), growth constant (K) and age at zero length (t_0) were estimated as 169.25 cm, 0.65 year⁻¹ and -0.01 years, respectively. The inscriptions on sagittal otoliths enable precise estimation of a fish's age down to the day (Fig. 4). Accordingly, age-length data was developed and population parameters especially, growth coefficient (K) were derived. The constant, K , derived from the age at length data analysis, is 0.709. The growth parameters estimated based on ELEFAN length-frequency analysis and otolith increment age analysis are shown in Table 1. Growth described by the von Bertalanffy model indicates rapid growth, reaching lengths of 81.5, 123.4, 145.3, 156.8 and 162.7 cm in FL by the end of the 1st, 2nd, 3rd, 4th and 5th years, respectively (Fig. 5). Their longevity (t_{max}) in Indian waters was estimated at 5.3 years.

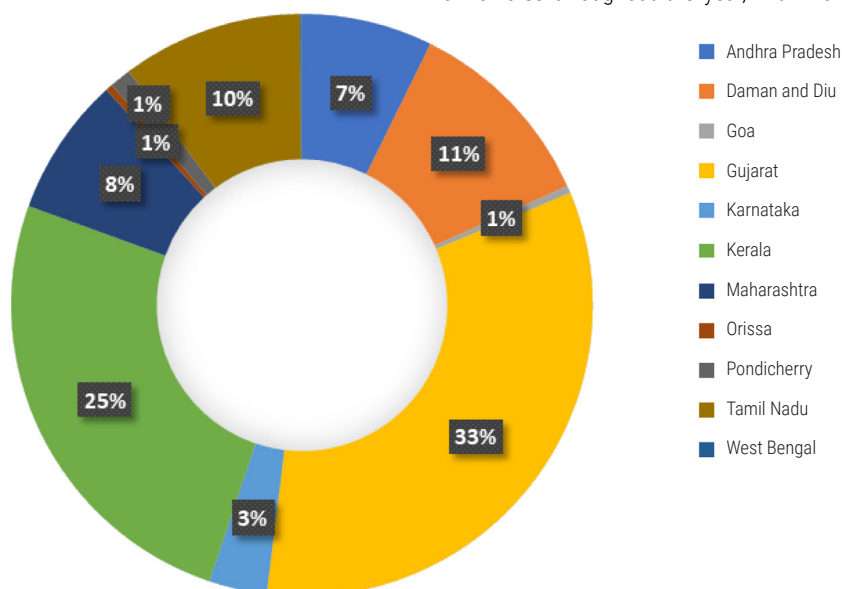


Fig. 2. Average state-wise percentage contribution of landings of dolphin fish during 2007 – 2020

Table 1. Estimates of growth parameters of *C. hippurus* along the Indian coast

Growth parameters	ELEFAN length-frequency analysis	Otolith increment age analysis
L_{∞} (FL, cm)	169.25	169.25
K (yr ⁻¹)	0.65	0.709
T_0 (yr)	0.01	0.088
T_{max} (yr)	5.3	4.9

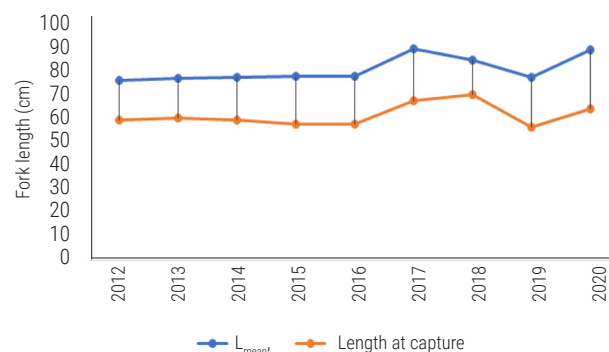


Fig. 3. Annual mean size and size at capture of common dolphin fish during 2012–20

The length-weight relationship parameters, 'a' and 'b', along with the coefficient of determination (R^2), are provided in Table 2 for males, females and the pooled population. The growth coefficient (b) values, all below 3, suggest a negative allometric growth pattern. Notably, females exhibit marginally higher weight, attributed to the consistent presence of mature females throughout the year within the population. Additionally, the plot for the combined population is depicted in Fig. 6.

Maturity, spawning and recruitment

Landings of dolphinfish along the coast predominantly comprised of females throughout the year, with males accounting for 44.3

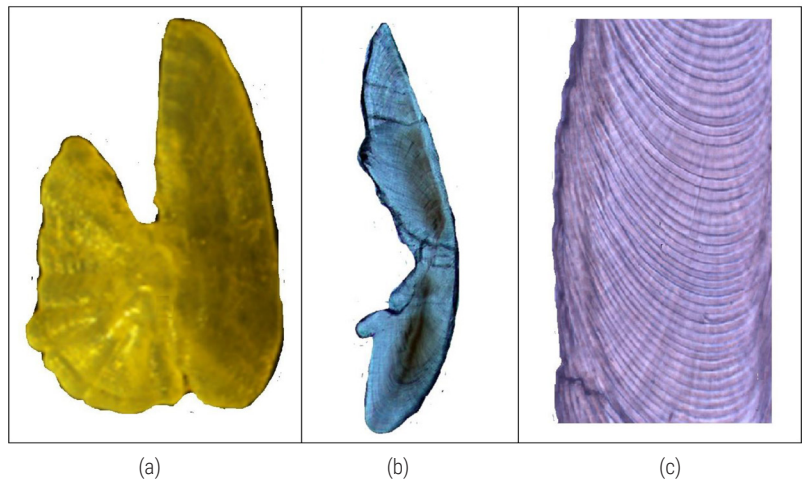


Fig. 4. (a) Light microscopic image of sagittal otolith of *C. hippurus*; (b) Transverse section of sagittal otolith at nucleus with clustered age rings (x40); (c) Daily growth rings (x100)

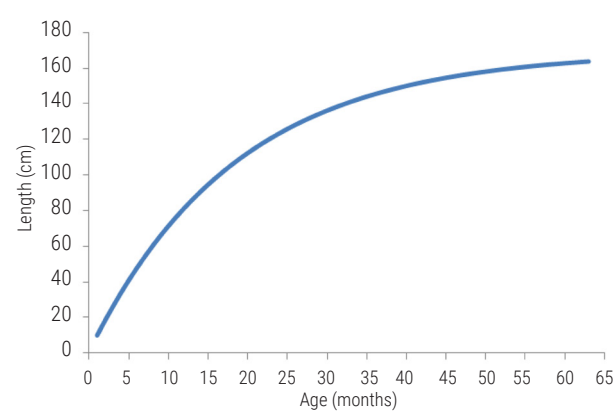


Fig. 5. Smoothed growth curve of *C. hippurus* depicting size increment with age

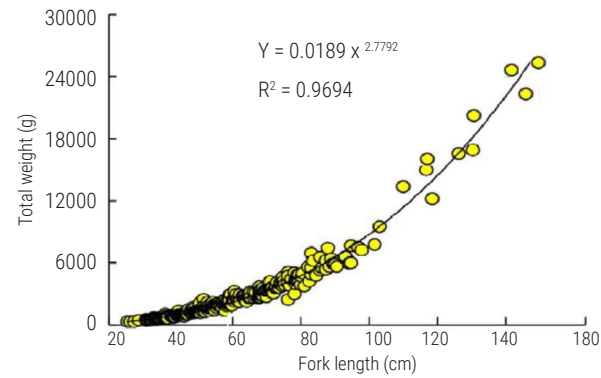


Fig. 6. Length-weight relationship of *C. hippurus* (pooled)

Table 2. Estimates of length-weight relationship of *C. hippurus*

Sex	N	Length range (FL, cm)	Weight range (g)	a	b	R ²
Male	326	24.6-152	236-24988	0.0207	2.7267	0.9607
Female	410	27.8-156	249-25318	0.0176	2.8119	0.9720
Pooled	736	24.6-156	206-25318	0.0189	2.7792	0.9694

and females for 55.7%, resulting in an overall sex ratio of males to females of 1:1.16. Monthly sex ratio analysis also indicated consistent differences in sex ratios. They achieve sexual maturity at a size of 38 cm, with the size at first maturity estimated at 41.6 cm FL (Fig. 7), significantly lower than their size at capture (L_{c50}) across all fishing gears targeting them. Their age at maturity (t_m) is approximately 5 months. The presence of gravid females suggests year-round spawning along both the east and west coasts, peaking from July to October. The frequency distribution of oocytes in the ripe ovary reveals the occurrence of more than three distinct modes, indicating continuous spawning. Ripe ovaries weigh between 14.9 and over 21.2% of the fish body weight. Fecundity estimates, based on 67 ripe ovaries collected from across the coast, ranged from 78,235 to 1,647,890 oocytes, with a mean of 527,883 in specimens measuring 44.9 to 122.7 cm FL and weighing 990 to 12,840 g. Relative fecundity is also high, ranging between 57 and 308, with an average of 136 ova per gram body weight. Recruitment occurs year-round, with peaks in August and September, and size at recruitment ranging from 27.7 to 37.2 cm, with a mean size of 32.8 cm

Mortality and exploitation

The estimate of natural mortality (M) for the species stands at 1.42 yr⁻¹. Annual fishing (F) and total mortality (Z) varied between 0.5-1.41 and 1.92-2.83, respectively. Fishing mortality remained consistently below natural mortality throughout the observation period, indicating sustainable fishing practices. Virtual population analysis (VPA) revealed natural mortality dominance during the first year of life up to a size of 80 cm, with fishing mortality exceeding natural mortality for larger fishes. Exploitation rates were generally low, ranging from 0.26 to 0.498, with a mean rate of 0.43. The upper limit of exploitation rate (E_{max}) for maximum yield and

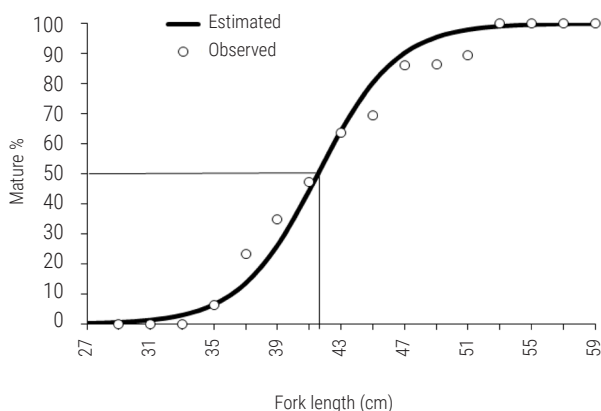


Fig. 7. Logistic curve showing length at first maturity (L_{m50}) of *C. hippurus*

sustainability was calculated at 0.56 (Fig. 8), suggesting that the resource remains underfished in current fishing grounds, indicating the potential for increased yield. Cohort analysis consistently highlighted significant spawning stock biomass (SSB) accounting for 97% of the standing stock biomass (StSB) throughout the study period. Thompson and Bell analysis further highlighted the significant potential for the species in Indian waters (Fig. 9.).

Stock status

The Kobe plot drawn for dolphinfish landed along the Indian coast (2012–2020) using year-wise stock parameters, primarily focusing on the biological reference points, B_{curr}/B_{msy} and F_{curr}/F_{msy} . Ratios greater than one for B_{curr}/B_{msy} and less than one for F_{curr}/F_{msy} indicated a healthy stock status. Consequently, the Kobe plot illustrated the stock status as safe (Fig. 10), confirming that the resource has remained free from overfishing and the biomass remains robust.

Discussion

Fisheries management requires an understanding of the fishing patterns and biological characteristics of harvested fish stocks. Therefore, the information on the stock status of this resource is of

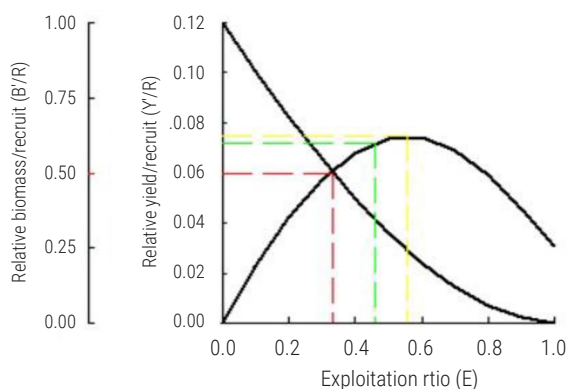


Fig. 8. Beverton and Holt's relative yield per recruit and average biomass per recruit models for *C. hippurus*. E10 - Green line; E50 (optimum sustainable yield) - Redline and the E_{max} (Maximum Sustainable Yield) - Yellow line

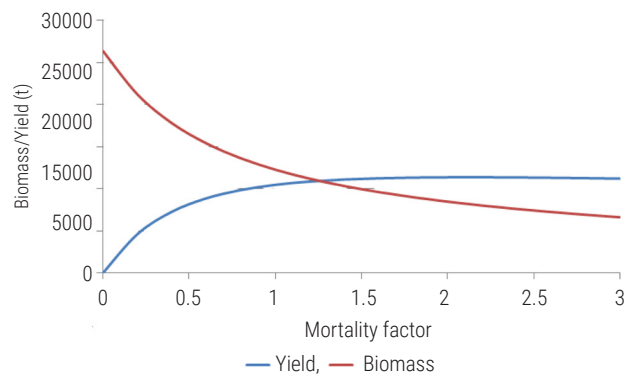


Fig. 9. Thompson and Bell plot depicting present level biomass and yield of *C. hippurus* along the Indian coast



Fig. 10. Kobe plot derived for *C. hippurus* showing fishing impact and biomass status

paramount importance for adopting proper management measures. A detailed study of dolphinfish shows that fishery is supported by two species, the common dolphinfish (*C. hippurus*) and pompano dolphinfish (*C. equiselis*), with the former dominating the fishery. Only two species of dolphinfish have been documented from Indian seas. The information provided by earlier researchers (Collette, 1981; Palko *et al.*, 1982) is consistent with all meristic counts and proportionate morphometric observations conducted in the current study to identify the fish. Dolphinfish landings improved steadily over the years and so can be considered a developing fishery. Length ranges similar to those recorded in the present study, 45–127.5 cm (Rose and Hassler, 1974), 35.8–147.9 cm (Perez *et al.*, 1992), 40–120 cm (Oxenford, 1985) and 35.8–132.3 cm (Perez and Sadovy, 1991), have been reported from North Carolina, Puerto Rico, Barbados and Puerto Rico, respectively. The dolphinfish landings exhibit a rising trend over recent years, highlighting the significant potential of this resource. Previous reports on the LWRs of *C. hippurus* vary slightly from the present study. Chatterji and Ansari (1985) estimated the b value as 2.894, while Kumar *et al.* (2017) found it to be 2.170 along the west coast of India. Recently, Rethesh *et al.* (2021) estimated the b value as 2.786 along the south-eastern Arabian Sea and Ghosh *et al.* (2022) reported a b value of 2.558 from the Bay of Bengal. Variations in b values between the current study and earlier estimates may be attributed to factors such as sample size, length range covered, ontogenetic development, season, population, sex, gonad maturity and diet (Tesch, 1971). However, our study uniquely provides separate LWR estimates for male and female *C. hippurus*

individuals, utilising a broader size range dataset encompassing all seasons from the Indian coast. The data obtained on LWRs can serve as valuable baseline information for biological and population studies. Additionally, it can be utilised as a practical tool to estimate fish weight when direct sample weight collection is challenging.

Sex ratio serves as fundamental information for evaluating the reproductive potential and estimating the population size of fish populations (Vazzoler, 1996). In our study, the overall male-female sex ratio of *C. hippurus* was determined to be 1:1.16, slightly deviating from the expected value of 1:1. Similar studies have reported varying female sex ratios in *C. hippurus* from different regions around the world, such as 1:1.9 in North Carolina waters (Rose and Hassler, 1974) and 1:1.8 in the Florida current (Oxenford, 1985). In Indian waters, observations include 1:2.05 from the South-west coast of India (Rajesh *et al.*, 2016), 1:1.75 from the Saurashtra coast (Saroj *et al.*, 2018), 1:2.09 from the Bay of Bengal (Ghosh *et al.*, 2022) and 1:3.25 from the South-eastern Arabian Sea (Assana *et al.*, 2021). These variations in sex ratios may be attributed to sexual disparities in migration, spawning, or other reproductive behaviours (Hunter and Macewicz, 1985). The smallest mature female observed and the estimated length at first maturity (L_{m50}) in the current study, 38 cm FL and 41.6 cm FL respectively, showed some variation from other studies. McBride *et al.* (2012) reported 45.2 cm for both sexes from the Florida Keys of the Atlantic Coast, while Schwenke and Buckel (2008) reported 45.8 cm for females and 47.6 cm for males from North Carolina. Kumar *et al.* (2017) reported a range of 35-40 cm FL for both sexes from the Saurashtra coast of India. In contrast, Ghosh *et al.* (2022) reported 59.9 cm for males and 54.5 cm for females, and Assana *et al.* (2021) reported 47.5 cm FL for both sexes in the south-eastern Arabian Sea, India. The small size comprising the dominant group in the fishery and early age of maturation (L_{m50}) may ensure large SSB levels for the species. The mean size and length at first capture (L_c) of the species during the entire period of study was also much higher compared to L_{m50} , thus depicting the healthy status of the stocks. This further may ensure a large SSB in the population and allow a large proportion of fish to spawn at least once in their lifetime.

In the present study, the batch fecundity of *C. hippurus* was estimated to range from 78,235 to 1,647,890 oocytes, which aligns closely with Beardsley's (1967) findings of 80,000 to 1,000,000 from the Straits of Florida. Similarly, Saroj *et al.* (2018b) reported a batch fecundity of 107,813 to 1,550,400 from the Saurashtra coast, and Ghosh *et al.* (2022) estimated a batch fecundity of 115,200 to 1,501,818 from the Bay of Bengal, India. Variations in fecundity among teleost fishes can be influenced by several factors, including species, stocks, individuals, geographical distribution, water temperature, food supply and food quality (Liao and Chang, 2011; Mian *et al.*, 2017). Early sexual maturation is a distinctive trait of this species, setting it apart from other large and fast-growing fishes. Coupled with their comparatively large fecundity, as observed in the present study, this characteristic renders them more resilient to predation and fishing pressures. Furthermore, their widespread distribution across tropical and subtropical regions, extensive migrations, and rapid growth rates (Briggs, 1960; Beardsley, 1967; Rose and Hassler, 1968) contribute to their lower vulnerability and ensure high sustainability.

The estimated growth parameters ($L = 169.25$ cm FL and $K = 0.65$ yr⁻¹) for *C. hippurus* in this study differed from the earlier report by

Benjamin and Kurup (2012) ($L = 194.25$ cm TL and $K = 0.40$ yr⁻¹) from the south-west coast of India. Notably, lower values of L_{∞} for this species were reported by Massuti *et al.* (1999) in the Mediterranean ($L_{\infty} = 102.4$ cm), Oxenford and Hunte (1983) in Barbados ($L_{\infty} = 120.8$ cm), Alejo-Plata *et al.* (2011) in the Gulf of Tehuantepec, Mexico ($L_{\infty} = 125.82$ cm in females and $L_{\infty} = 126.29$ cm in males) and Schwenke and Buckel (2008) in North Carolina ($L_{\infty} = 129.9$ cm). Among the values of K published by various studies, those by Furukawa *et al.* (2012) for the coast off west Kyushu in the northern East China Sea, and Solano-Fernandez *et al.* (2015) for the coast of Oaxaca and Chiapas, Mexico, were the closest to the results of the current study. Sagittal otolith analysis revealed growth patterns differing from those indicated by length frequency analysis at the same L_{∞} value. With a large K value (0.709), suggesting significantly accelerated growth compared to estimates from length frequency analysis, this precise value served as the cornerstone for all subsequent stock assessment endeavours concerning this species. These findings, echoing the insights of Abdussamad *et al.* (2022) in their recent investigation on Indian oil sardine, mark the pioneering exploration of mahi mahi from India and beyond in this domain. Contrasting the outcomes of length frequency analysis and otolith-based analysis, the latter exhibited a markedly swifter growth rate in the species. Given its status as a continuous spawner, there exists substantial potential for multiple modes to influence length-based parameter estimates. Consequently, the study highlights the potential for enhancing the precision of length-based stock assessment outputs through the integration of age and growth data gleaned from hard part analysis. Thus the population characteristics indicated relatively fast growth and early sexual maturity at a size of about 41 cm FL and age of 5 months.

In the present study, the annual natural mortality, fishing mortality, and total mortality rates estimated for *C. hippurus* were 1.42, 1.07 and 2.49, respectively. The M/K ratio was calculated at 2.18 for *C. hippurus*, falling within the suggested range of 1-2.5 by Beverton (1956), indicating that the present estimate of M appears reasonable for this species. These mortality rate estimates differ from an earlier study on the south-west coast of India (Benjamin and Kurup, 2012), where M , F and Z were estimated at 0.6, 0.37 and 0.97, respectively. This variation in mortality rates could be attributed to various fishing pressures, abiotic and biotic factors, and predation affecting the stock, such as year-class strength and growth, as observed by Bilgin *et al.* (2014). The exploitation rate (E) estimated here was 0.43, while the E_{max} was 0.556. Previous estimates of the exploitation rate for *C. hippurus* were reported as 0.38 for the south-west coast (Benjamin and Kurup, 2012) and the entire Indian coast (Manjusha *et al.*, 2012). Both earlier and present estimates of exploitation rates (E) for the species are less than 0.5, which falls well within the optimum level as suggested by Gulland (1971). The yield curve from Thompson and Bell analysis shows a steady increase, indicating fishery is still in a developing phase and the maximum yield level cannot be predicted for the resource. Results interpretation for the period indicated a potential yield of 11,366 t from current fishing areas, although doubling present effort levels may not be sustainable to achieve this from the current yield of 10,470 t. The stock status trajectory of *C. hippurus* lies in the green panel of the Kobe plot, which also depicts the healthy status of stocks. Given its status as a non-targeted resource, the fishery is expected to naturally improve with overall development and

expansion of fishing activities to deeper coastal areas. The stock of the resource currently maintains a healthy state and displays resilience, indicating no immediate need for management however, continuous monitoring of the fishery and stock characteristics is essential. This ongoing surveillance will ensure timely intervention if need arises in the future.

Dolphinfishes, belonging to the genera *Coryphaena*, are highly migratory and fast-moving pelagic oceanic fishes of significant economic importance in both recreational and commercial fisheries. The increasing trend in dolphinfish landings over recent years highlights the considerable potential of this resource and the identified species include *C. hippurus* and *C. equiselis*. Information regarding sex ratio, length at maturity and fecundity is crucial for understanding the reproductive biology of *C. hippurus* and developing suitable fishery management strategies for its sustainable exploitation. The present study serves as an effective tool for fishery biologists, managers and conservationists in devising management strategies and implementing regulations for the sustainable conservation of this species. With its fast growth, high fecundity and maturity attained within six months, *C. hippurus* emerges as a candidate species for mariculture. A preliminary attempt at aging using otoliths was made in this study and there is ample scope for expanding the current knowledge. Dolphinfishes are presently underexploited, suggesting further potential for increasing production.

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