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Research Article

Diet composition and feeding behaviour of *Tentoriceps cristatus* (Klunzinger, 1884), from the southwest coast of India

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Hairtails are considered a major fishery in India. Increased export demand for this resource resulted in targeted fisheries and subsequent overexploitation. Crested hairtails can be considered as a potential hairtail resource to meet the present-day demand. Studies on hairtails were limited to commercially important species, and no attempt has been made to understand the feeding ecology of crested hairtails. The present study delineated the dietary habits and feeding patterns of the crested hairtail throughout the southwestern coastline of India. Specimens were obtained from the landing centres of Sakthikulangara and Kalamukku in Kerala, India, between January 2019 and December 2021. The index of relative importance elucidated 17 prey items, including crustaceans, cephalopods, fishes, eggs, and larvae. *Uroteuthis* sp. (31.07 %), *Aristeus alcocki* (29.05 %), and other penaeid shrimps dominated among the gut contents. The presence of *Bregmaceros* sp. and *Trichiurus auriga* in the diet indicates that crested hairtails inhabit depths ranging from 50 to 900 m. The presence of plankton, amphipods, and *Lucifer* spp. validated the diurnal vertical movement of the fish. Studies on feeding intensity indicated poor feeding rate, and sex-wise and size-wise variation in feed intake. The study confirmed the carnivorous nature of the fish, with no cannibalistic feeding behaviour. The trophic level index was estimated at 4.06, indicating that the crested hairtail is a top predator. Results will provide food and feeding behaviour of this potential hairtail resource and signify its ecological importance.

[**Keywords**: Arabian Sea, Ecology, Feeding behaviour, Hairtail, India, Trophic dynamics]

Introduction

Hairtails are predominantly carnivorous fish belonging to the Family Trichiuridae[1], comprising over 7.64 % of marine fish landings in India[2]. The substantial demand for hairtail exports to China and other Southeast Asian countries has led to the emergence of specialised fisheries for this resource in India[3]. Among hairtails, *Trichiurus lepturus* and *Lepturacanthus savala* comprise more than 90 % of India's hairtail landings[4]. Despite the absence of legal restrictions on fishing methods, these species appear to have experienced overfishing[5]. Among other hairtails, the crested hairtail, *Tentoriceps cristatus* (Klunzinger, 1884), is identified as a potential resource for commercial explotation[3]. Exploitation of crested hairtails in a sustainable manner may lead to a reduction in fishing pressure on other hairtails.

Crested hairtail is a benthopelagic hairtail that inhabits the coastal regions of the Red Sea and Indo-West Pacific, encompassing areas of Africa, Australia, Korea, India, and Japan[6,7]. Since it is a non-targeted species and is frequently caught as bycatch by trawlers along southwest coast of India, catch data for the species are unavailable. Chitra *et al.*[3] stated that the crested hairtail is a substantial source of omega-3 fatty acids, and the prevalence of fatty acids, including polyunsaturated fatty acids, underscores their potential as nutritional supplements and pharmaceuticals. Overexploitation of commercially important species has made crested hairtail a potential resource for near-future exploitation due to its nutritional benefits and pharmaceutical uses.

Among hairtails, most studies were limited to commercially important species, namely large head hairtail[8-25] and savalai hairtail[13,26-28]. Limited research has been conducted on the feeding habits of hairtails, including small head hairtail, *Eupleurogrammus muticus*[13,29-31], long tooth hairtail, *E. glossodon*[13], and pearly hairtail, *T. auriga*[32]. However, no attempt has been made to understand the food and feeding habits of crested hairtails. Hence, the present study aims to provide a detailed account of the feeding ecology of the crested hairtail in Indian waters. The results will help policymakers develop strategies for the sustainable use and management of the species. Additionally, this study is the first comprehensive examination of the feeding ecology of crested hairtail worldwide.

Materials and Methods

Sampling method

Fresh specimens of crested hairtail were collected from the bottom trawl landings at the fishing harbours of Sakhthikulangara (8°55′30″ N latitude and 76°33′22″ E longitude) and Kalamuk, Kerala (9°59′01″ N latitude and 76°14′32″ E longitude), between January 2019 and December 2021. Single/multiday fishing trawlers operating across the southern and central parts of Kerala waters land their catch at these landing centres. Specimens collected were identified using standard references[7,33]. Total length and weight of the specimens were recorded to the nearest 0.1 centimetres (cm) and 0.1 grams (g), respectively. A total of 481 specimens (221 males and 260 females) collected bimonthly were analysed for the study. Specimens were transported to the laboratory in iced styrofoam boxes. The fishes were then dissected, and the fullness of the stomachs was noted by visual examination for distention and the amount of food they held. The stomachs were then categorised as gorged, full, ¾ full, ½ full, ¼ full, trace, and empty[25]. The gut was removed, and its length and weight were noted. A thorough examination of the prey items was carried out after the dissection of the gut. Each individual prey item was identified to the lowest possible taxon using standard references[13,33] and its number and weight were recorded. Data on prey items were subjected to the following analysis.

Index of Relative Importance (IRI)

The Index of Relative Importance (IRI) helps to evaluate the priority of predators prey. IRI was analysed using the following formula[23]:

$$IRI = (\%N + \%W) \times \%F$$

Where, N = numerical percentage, W = volumetric percentage, and F = frequency of occurrence percentage.

Index of Fullness (IF)

The points approach assessed the average feeding intensity[13]. For gorged, full, ¾ full, ½ full, ¼ full, trace, and empty stomachs, points were given as 10, 9, 7.5, 5.5, 2.5, 1, and 0, respectively. Month-wise, sex-wise, and length-wise index of fullness (IF)[34] was calculated using the following formula:

$$IF = w \div W \times 100$$

Where, w = weight of the gut content in grams, W = weight of the fish in grams

Gastrosomatic Index (GaSI)

A population's seasonal feeding patterns were described by its Gastro-Somatic Index (GaSI) in a naturally occurring population. Gastro-somatic Index[35], was calculated by using the equation:

$$GaSI = Weigth\ of\ gut \div weigth\ of\ fish \times 100$$

Vacuity Index (VI)

The Vacuity Index (VI) measures feeding periodicity, characterised as the proportion of empty stomachs in population[36].

$$Vacuity\ Index\ (VI) = Es \times 100 \div Ts$$

Where, Es = number of empty stomach samples, and Ts = Total number of stomach samples. The vacuity index is interpreted as 0–20 - edacious; 20–40 - relatively edacious; 40–60 - moderately fed; 60–80 - relatively low fed, and 80–100 - low fed[1].

The percentage of specimens with an empty stomach among all tested specimens was used to determine the Empty Stomach Ratio (ESR).

Trophic Level (TrL)

Trophic levels of the species were estimated based on the stomach contents using the formula[26]:

$$TrL = 1 + \sum(DCi \times TLi)$$

Where, TrL - Trophic level, DCi - the proportion of prey species in the diet of crested hairtail, and TLi - Trophic level of the species.

Results

Food composition

Analysis of gut contents revealed that crested hairtail feeds on 17 prey items (Fig. 1). The dietary composition percentages were indicated by the IRI and furnished as Table 1. As shown in Table 1, *Uroteuthis* spp. was the dominant prey with 31.07 % of total gut contents. *Aristeus alcocki* (29.05 %), other penaeid shrimps (25.11 %), and *T. auriga* (11.44 %) were the other prominent prey items recorded during the study. Partially digested fish and fish eggs contributed 0.94 % and 0.5 %, respectively. Fish scales (0.26 %) and larvae (*Acetes* spp. (0.31 %), squilla (0.23 %), euphausid (0.32 %), isopod (0.21 %), lucifer (0.12 %), branchiopod (0.13 %), and amphipod (0.06 %)) were also observed as prey items. Plankton species (*Trichodesmium* spp. (0.08 %), *Cosmarium* spp. (0.04 %)) and small fish *Bregmaceros* spp. (0.13 %), were also observed intermittently.

Month-wise food composition

The results of the month-wise percentage of IRI are shown in Figure 2. As shown in Figure 2, the index reached its peak in November, with *A. alcocki* (71.6 %), *Uroteuthis* sp. (59.1 %), other penaeid shrimps (56.3 %), and *T. auriga* (22.4 %). IRI was minimal during May, with dominance of penaeid shrimps (10.88 %). *Uroteuthis* spp. and penaeid shrimp were observed throughout the year. However, *Bregmaceros* spp. was recorded only during October (0.88 %) and November (0.54 %).

Fig. 1 — Prey items observed in the gut of *Tentoriceps cristatus* from southwest coast of India

Feeding intensity

The results of the feeding intensity studies are illustrated in Figure 3. Feeding intensity of 52 % of crested hairtails was poor. Sex-wise feeding intensity revealed that feeding activity was poorer in males (65 %) than in females (46 %). Seasonal feeding intensity of crested hairtail is furnished as month-wise feeding intensity (Fig. 4). As shown in Figure 4, active feeding activity (gorged, full, or three-quarters full) has been noted from September to December, while poor feeding activity (one-quarter full, traces, or empty) was observed from March to August.

Index of Fullness (IF)

Index of fullness of male, female and pooled crested hairtail were 1.92, 2.41 and 2.17, respectively. Month-wise indices of fullness for crested hairtail for males, females, and the pooled data were estimated and presented in the Figure 5. The index was highest in February for both male and female and was lowest in August. The feeding activity showed an increasing trend from August to February. The length-wise index of fullness (Fig. 6) recorded the highest feeding

Table 1 — Diet composition of *Tentoriceps cristatus* (% IRI) from south west coast of India

Food items	N	%N	F	%F	W	%W	IRI	%IRI
Uroteuthis sp.	92	12.20	53	7.12	56.52	46.75	345.25	31.07
Trichiurus auriga	68	9.02	32	4.30	33.18	27.45	127.07	11.44
Bregmaceros sp.	3	0.40	2	0.27	4.62	3.82	1.43	0.13
Aristeus alcocki	232	30.77	258	34.68	10.18	8.42	322.78	29.05
Other penaeid shrimps	156	20.69	273	36.69	8.51	7.04	278.99	25.11
Ephausid	27	3.58	27	3.63	0.00	0.00	3.58	0.32
Isopod	18	2.39	6	0.81	0.00	0.00	2.39	0.21
Amphipod	5	0.66	4	0.54	0.00	0.00	0.66	0.06
Acetes larvae	26	3.45	12	1.61	0.00	0.00	3.45	0.31
Squilla larvae	19	2.52	8	1.08	0.00	0.00	2.52	0.23
Lucifer	10	1.33	2	0.27	0.00	0.00	1.33	0.12
Trichodesmium	7	0.93	1	0.13	0.00	0.00	0.93	0.08
Branchiopod	11	1.46	6	0.81	0.00	0.00	1.46	0.13
Cosmarium	3	0.40	4	0.54	0.00	0.00	0.40	0.04
Partially digested fish	13	1.72	10	1.34	7.88	6.52	10.49	0.94
Fish eggs	42	5.57	28	3.76	0.00	0.00	5.57	0.50
Fish scale	22	2.92	18	2.42	0.00	0.00	2.92	0.26

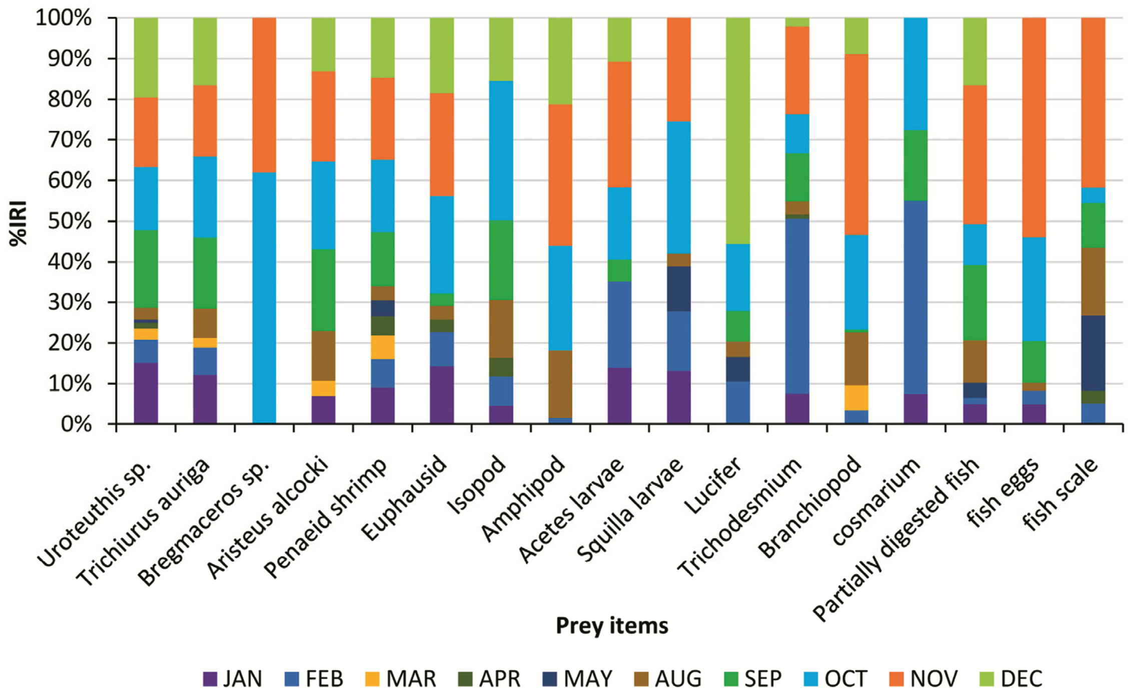

Fig. 2 — IRI(%) of *Tentoriceps cristatus* prey items from the southwest coast of India

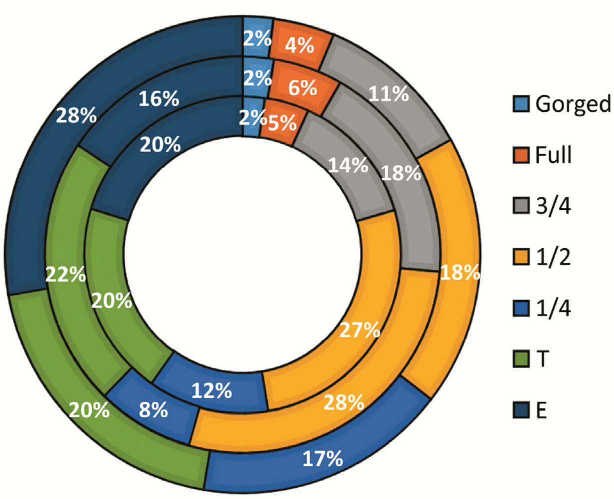

Fig. 3 — Feeding intensity (%) of *Tentoriceps cristatus* (inner circle pooled, middle circle female, and outer circle male) from the southwest coast of India

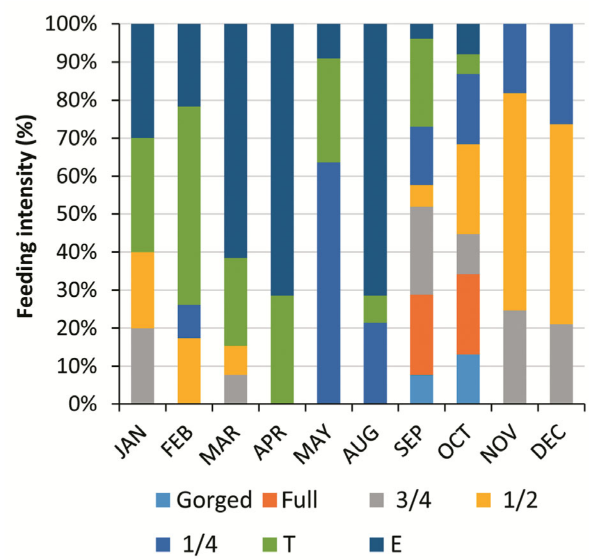

Fig. 4 — Month-wise feeding intensity of *Tentoriceps cristatus* (pooled) from southwest coast of India

activity when fish reach 51 to 60 cm. The lowest was recorded in 41 to 50 cm length class.

Gastrosomatic Index (GaSI)

Month-wise gastrosomatic index of male and female crested hairtail is represented in Figure 7. GaSI for both males and females was highest in February and lowest in August. Females were found to be fed more actively than males throughout the period, except in February. However, there were no significant differences recorded between GaSI values of males and females ($P > 0.05$).

Vacuity Index (VI) and Empty Stomach Ratio (ESR)

The present study estimated the vacuity index of crested hairtail at 23.27. Month-wise percentage of empty stomach ratio (Fig. 8) ranged between 10.31

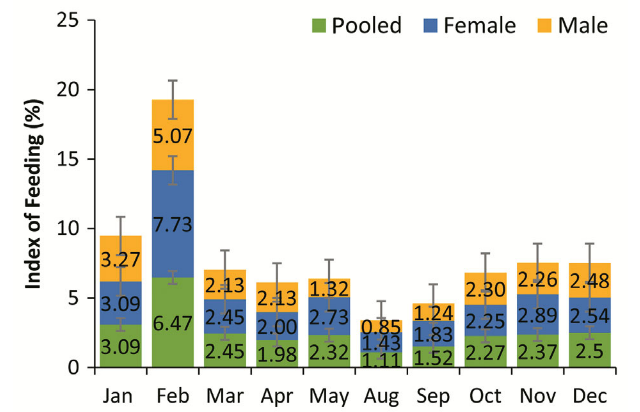

Fig. 5 — Index of feeding of *Tentoriceps cristatus* (pooled, male and female) from southwest coast of India

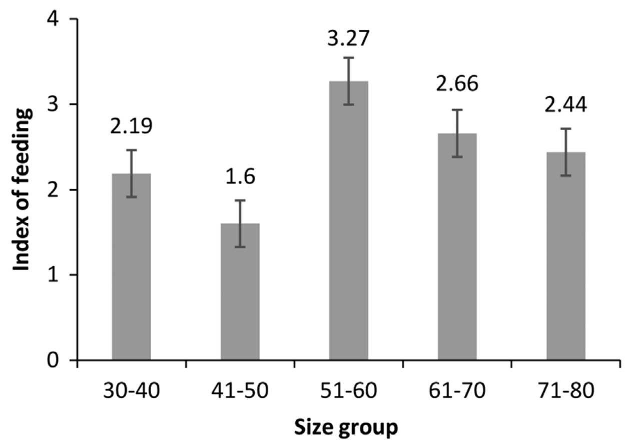

Fig. 6 — Index of fullness of *Tentoriceps cristatus* (length-wise) from southwest coast of India

(November) and 62.96 (August). In general, the empty stomach ratio has shown a decreasing trend since August.

Trophic Level (TrL)

The study estimated the trophic level of crested hairtail as 4.06 using IRI values. Results indicate that crested hairtail can be considered a top predator.

Discussion

Results of the present study indicated that crested hairtail is a carnivorous species fed mainly on crustaceans (54.35 % *A. alcocki*, other penaeid shrimps, branchiopod, amphipod), cephalopods (31.07 % *Uroteuthis* spp.), fishes (12.77 %), and eggs and larvae (1.81 %) (Table 1; Fig. 1). As per the result of IRI, the diet compositions of crested hairtail were similar to that of other hairtail species. No cannibalistic behaviour was reported during the present study. Food and feeding behaviour of hairtails has been studied elsewhere in the world[1,4,5,9,11,12,37]. Results confirm that hairtails are voracious carnivores with cannibalistic behaviour. Results of the present study validate that hairtails are carnivorous; however, the cannibalistic behaviour of hairtails reported by earlier workers[1,4,5,9,11,12,37] was not observed in crested hairtail.

The crested hairtails are reported to be found at depths of 55 to 80 m[6,7,38,39]. Conversely, Burhanuddin *et al.*[41] reported the occurrence of crested hairtail from a depth range of 140 to 367 m. Results of the present

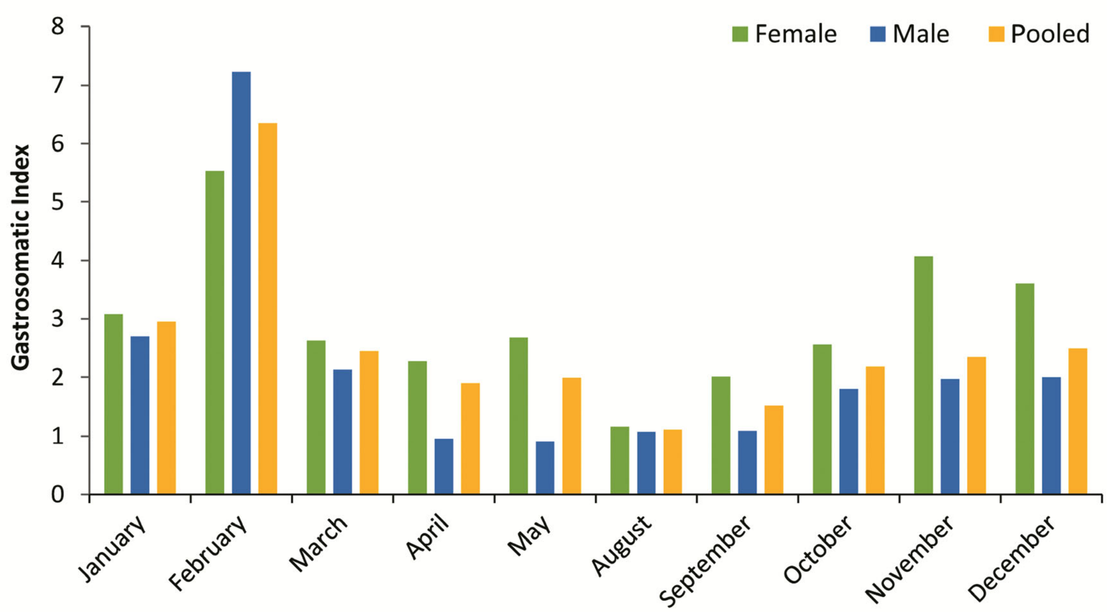

Fig. 7 — Month-wise Gastro-Somatic Index (GaSI) of *Tentoriceps cristatus* (sex-wise & pooled) from southwest coast of India

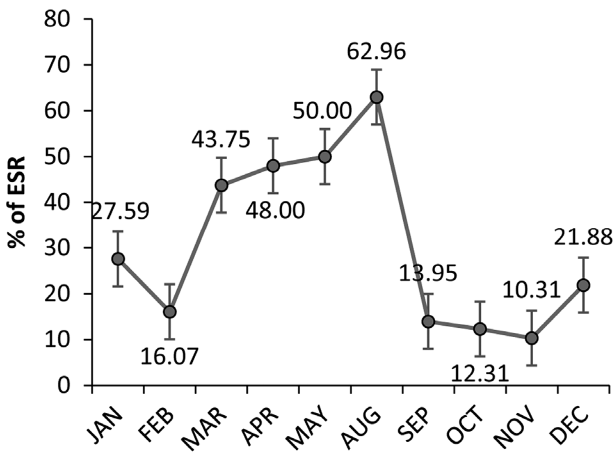

Fig. 8 — Monthly changes in empty stomach ratio (%) of *Tentoriceps cristatus* from the southwest coast of India

study revealed that the main components of the diet are fishes from depths of 250 to 900 m, including *Bregmaceros* sp. and pearly hairtail. Additionally, the presence of *A. alcocki*, which is distributed from 200 m to 850 m, strongly suggests that crested hairtail is a benthopelagic fish inhabiting a depth range of 50 to 900 m.

The occurrence of plankton such as *Lucifer* spp., *Trichodesmium* spp., and copepods, amphipods, euphausiids, etc., was reported from the stomach contents of large head hairtail, long tooth hairtail, and savalai hairtail[12,13,40]. Similar food items were present in the gut content of crested hairtails, and the occurrence was more during the post-monsoon season. This indicates the fish's vertical movement to benefit from food resources in the upper regions.

Feeding intensity of crested hairtail was relatively poor (Figs. 3 & 4). In general, poor feeding intensity was reported for hairtails[13,28,37]. Spontaneous ejection of food items while they get caught in trawl nets[42-44], nocturnal feeding[19,43], and intermittent availability of prey were the causes of poor feeding. Moreover earlier studies[45,46] elucidated that deep-sea fishes often feed at lower rates than coastal and epipelagic fishes.

Seasonal difference in feeding intensity (Fig. 4) was observed during the study. Results are consistent with earlier studies on large head hairtail[13], where, in females, feeding intensity peaked in December (September to December), and in males it peaked in November (September to January). In the case of crested hairtails, feeding intensity was higher during the post-monsoon season and lowest during summer. Feeding intensity was assessed by estimation of the index of fullness (Figs. 5 & 6). Results indicated poor feeding rates and seasonal differences. The index of fullness of crested hairtail was high in February and was low in August. Results were matched with those of large head hairtail[21] where, the index of fullness was high during January to March and September to October, and lower in November and December[3]. Analysis of length-wise index of fullness (Fig. 6) indicated an increase in feeding rates when they reach adulthood. Rajesh *et al.*[37] reported increased feeding intensity in large-sized hairtails than in smaller ones.

Results of the gastro-somatic index (Fig. 7), vacuity index and ESR (Fig. 8) indicated poor feeding rate and seasonal differences in feeding intensity. In savalai hairtail, the gastro-somatic index was high from March to November in females and from April to November in males[40]. In large head hairtail, the highest GSI was recorded in February for both males and females and then dropped in August for males and in September for females[21]. Hence, it can be presumed that crested hairtail follows a feeding pattern similar to that of large head hairtail.

Vacuity index of crested hairtail was estimated at 23.27 % which suggest that the species is edacious[1,36]. 20 % of empty stomach was recorded during the study. Compared to the large head hairtail (45 %), the empty stomach ratio is lower in the crested hairtail. Highest number of empty stomachs is a characteristic of piscivorous fish[1,19,22]. Hence, it can be presumed that crested hairtail cannot be considered a piscivorous fish. Moreover, the results of IRI indicate that crested hairtail prefer crustaceans over fish as its prey.

The trophic level of crested hairtail was estimated at 4.06, which is consistent with the estimate from FishBase[47], which is 4.21. Trophic index of other hairtails ranges from 3.99 (Ganges hairtail) to 4.42 (large head hairtails)[47]. Hence, it can be concluded that crested hairtail is a top predator.

Conclusion

Crested hairtail is considered a potential hairtail resource after large head hairtail and savalai hairtail. The present study provides vital information on the feeding ecology of crested hairtail. Results of this primary study will help with the sustainable exploitation of this resource. Findings indicate that the crested hairtail feeds on a variety of prey items, including crustaceans, cephalopods, fishes, eggs, and larvae. It is a carnivorous, top predator fish species, which preferably feeds on crustaceans. Feeding intensity and ESR studies indicate that crested hairtails cannot be categorised as piscivorous fish. Unlike other hairtails, cannibalistic feeding behaviour is not observed in the crested hairtail. Commercial potential, wide diversity of prey items, carnivorous nature and higher trophic index of crested hairtail signify its ecological importance. Hence, the present study recommends an in-depth examination of its feeding ecology and measures to sustainably exploit this potential resource.

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Conflict of Interest

There is no conflict of interest for this article.

Author Contributions

MCC: Conceptualisation, data curation, formal analysis, investigation, methodology, visualization, and writing- original draft preparation; MKS: Conceptualisation, methodology, supervision, validation, and writing – review & editing; and BMR: Data curation and writing – review & editing.

References

1 Mohammed K K, Vase V K, Abdul A P, Sreenath K R, Dash G, *et al*, Diet composition and feeding dynamics of *Trichiurus lepturus* Linnaeus, 1758 off Gujarat, north-west coast of India, *Indian J Fish*, 65 (2) (2018) 50-57. https://doi.org/10.21077/ijf.2018.65.2.69184-06

2 Rohit P, Rajesh K M, Sampath K G & Sahib K, Food and feeding of the ribbonfish *Trichiurus lepturus* Linnaeus off Karnataka, southwest coast of India, *Indian J Fish*, 62 (1) (2015) 58-63. https://eprints.cmfri.org.in/10349/1/10.pdf

3 Chitra M C, Sajeevan M K & Abhilash S, Biochemical composition of a discard species, crested hairtail, *Tentoriceps cristatus* (Klunzinger, 1884), from Indian waters, *Res J Agric Sci*, 13 (5) (2022) 1554–1559.

4 CMFRI, *Annual Report 2024*, (Central Marine Fisheries Research Institute, Kochi), 2024, pp. 286.

5 Ghosh N S, Rohit N P, Muthurathinam N A, M Rajesh, N K M Koya, *et al.*, Fishery and stock dynamics of ribbonfish *Trichiurus lepturus* (Linnaeus, 1758) in the Indian Exclusive Economic Zone, *Indian J Fish*, 71 (3) (2024) 8-17. https://doi.org/10.21077/ijf.2024.71.3.131126-02

6 Senta T, Redescription of trichiurid fish *Tentoriceps cristatus* and its occurrence in the South China Sea and the Straits of Malacca, *Jpn J Ichthyol*, 21 (4) (1975) 175-182. https://doi.org/10.11369/jji1950.21.175

7 Nakamura I & Parin N V, *Snake mackerels and cutlassfishes of the world (families Gempylidae and Trichiuridae)*, FAO species catalogue, Vol 15, FAO Fish Synops 125 (1993) i–vii + 1–136.

8 Venkataraman R S, The food of ribbon-fishes, *Trichiurus* spp., *Curr Sci*, 13 (9) (1944) 1-239. https://eprints.cmfri.org.in/1669/1/Article_12.pdf

9 Devasenan D W & Chidambaram K, *The common food fishes of the Madras Presidency*, A Madras Government Publication, 1948, pp. 38.

10 Vijayaraghavan P, Food of the ribbon fishes of Madras, *J Madras Univ*, 21 (1) (1951) 81-95. https://eprints.cmfri.org.in/ 7204/1/ 208JOURNAL_OF_MADRAS_UNIVERSITY_1955. pdf

11 Prabhu M S, Some aspects of the biology of the ribbonfish *Trichiurus haumela* (Forsk.), *Indian J Fish*, 2 (1955) 132-163. https://epubs.icar.org.in/index.php/ IJF/article/view/11182

12 James P S B R, The Ribbonfishes, *Souvenir 20th Anniversary Central Marine Fisheries Research Institute*, (CMFRI, Mandapam), 1967, pp. 1-132. https://eprints.cmfri.org.in/5583/1/Souvenir_20th_Anniversary.pdf

13 Narasimham K A, Occurrence of early juveniles of the ribbonfish, *Trichiurus lepturus* Linn. in the Kakinada area with notes on their food, *Indian J Fish*, 19 (1&2) (1972) 210-214. https://epubs.icar.org.in/index.php/IJF/article/view/13158

14 Pillai T V R, A critique of the methods of study of food of fishes, *J Zool Soc India*, 4 (1952) 1885-1200.

15 Portsev P I, The feeding of the cutlassfish, *Trichiurus lepturus* (Trichiuridae), off the west coast of India, *J Ichthyol*, 20 (5) (1980) 60-65.

16 Zhang B, Feeding habits and ontogenetic diet shift of hairtail fish (*Trichiurus lepturus*) in East China Sea and Yellow Sea, *Mar Fish Res*, 25 (2) (2004) 6-12. https://doi.org/10.1007/s00343-011-0004-z

17 Martins A S, Haimovici M & Palacios R, Diet and feeding of the cutlassfish *Trichiurus lepturus* in the subtropical convergence ecosystem of southern Brazil, *J Mar Biol Assoc UK*, 85 (2005) 1223-1229. https://doi.org/10.1017/S002531540501235X

18 Chiou W D, Chen C Y, Wang C M & Chen C T, Food and feeding habits of ribbonfish *Trichiurus lepturus* in coastal waters of south-western Taiwan, *Fish Sci*, 72 (2) (2006) 373-381. https://doi.org/10.1111/j.1444-2906.2006.01159.x

19 Bakhoum S A, Diet overlap of immigrant narrow–barred Spanish mackerel *Scomberomorus commerson* (Lac., 1802) and the largehead hairtail ribbonfish *Trichiurus lepturus* (L., 1758) in the Egyptian Mediterranean coast, *Anim Biodivers Conserv*, 30 (2) (2007) 147-160. https://doi.org/10.32800/abc.2007.30.0147

20 Bittar V T, Castello B D F L & Di Beneditto A P M, Feeding habits of adult swordfish, *Trichiurus lepturus*, on the north

coast of Rio de Janeiro, south eastern Brazil, *Biothems*, 21 (2) (2008) 83-90.

21 Bittar V T & Di Beneditto A P M, Diet and potential feeding overlap between *Trichiurus lepturus* (Osteichthyes: Perciformes) and *Pontoporia blainvillei* (Mammalia: Cetacea) in northern Rio de Janeiro, Brazil, *Zoologia*, 26 (2) (2009) 374-378. https://doi.org/10.1590/S1984-46702009000200023

22 Yan Y, Chen J, Lu H, Hou G & Lai J, Feeding habits and ontogenetic diet shifts of hairtail, *Trichiurus margarites*, in the Beibu Gulf of the South China Sea, *Acta Ecol Sin*, 32 (1) (2012) 18-25. https://doi.org/10.1016/j.chnaes.2011.04.008

23 Gushchin A V & Corten A, Feeding of pelagic fish in waters of Mauritania: 2. Representatives of Families Carangidae, Scombridae, Pomatomidae, and Trichiuridae, *J Ichthyol*, 56 (1) (2016) 98-106. https://doi.org/10.1134/S0032945216010045

24 Gomathy S & Vivekanandan E, Changes in the diet of predatory ribbonfish *Trichiurus lepturus* Linnaeus, 1758 with increasing body size along Chennai coast, *Indian J Fish*, 64 (4) (2017) 34-43.

25 Mustafa M G A & Begum M, Some aspects of the biology of the ribbon fish *Lepturacanthus savala* Cuvier in the Bay of Bengal, *Proc Ninth Natl Zool Conf Bangladesh*, 1994, pp. 23-30.

26 Azadi M A & Ullah M, Food and feeding habits of the ribbon fish, *Lepturacanthus savala* (cuvier, 1829) from the bay of Bengal, *J Asiat Soc Bangladesh Sci*, 35 (1) (2009) 57-64.

27 Sangita R K, Rathod J L & Yadav R B, Qualitative and Quantitative Analysis of Stomach Content of Ribbon Fish *Lepturacanthus savala* (Cuvier, 1829) From Karwar Waters, Karnataka, India, *J Surv Fish Sci*, 10 (2) (2023) 144-150.

28 Narasimham K A, Some observations on the biology of the ribbon fish *Eupleurogrammus muticus* (Gray), *Indian J Fish*, 21 (2) (1974) 479-494.

29 Rizvi A F, Food and feeding habit of Indian ribbonfish *Eupleurogrammus muticus* from Northwest sector of Mumbai coast, *Bioherald: Int J Biodivers Environ*, 1 (1) (2011).

30 Eighani M, Daliri M, Paighambari S Y & Alizadeh E, Length-weight relationship and GSI index of smallhead hairtail, *Eupleurogrammus muticus* (Gray, 1831), northern Persian Gulf, Hormozgan coastal waters, *J App Ichthyol*, 30 (1) (2013) 257–258. https://doi.org/10.1111/jai.12285

31 Silas E G & Rajagopolan M, Studies on demersal fishes of the deep neritic waters and the continental slope 2 on *Trichiurus auriga* Klunzinger, with notes on its biology, *J Mar Biol Assoc India*, 16 (1) (1974) 53-274.

32 Smith M M & Heemstra P C, *Smith's Sea fishes*, (Southern Book Publications, Johannesburg), 1986, pp. 907.

33 Philip K P, *Studies on the biology and fishery of the fishes of the Family Priacanthidae (Pisces: Perciformes) of Indian waters*, Doctoral dissertation, Cochin University of Science and Technology, Kochi, 1994, pp. 139. http://dyuthi.cusat.ac.in/purl/3677

34 Pinkas L, Food habits of albacore, bluefin tuna, and bonito in California waters, *Fish Bull*, 152 (1971) 1-139. https://escholarship.org/uc/item/7t5868rd

35 Hyslop E J, Stomach contents analysis: a review of methods and their application, *J Fish Biol*, 17 (1980) 411-429. https://doi.org/10.1111/j.1095-8649.1980.tb02775.x

36 Rajesh K M, Prathibha R, Shubhadeep G, M Muthurathinam, M Sivadas, *et al*., Diet composition and feeding behavior of largehead hairtail *Trichiurus lepturus* Linnaeus 1758 along the Eastern Arabian Sea and Western Bay of Bengal, *Indian J Geo-Mar Sci*, 51 (11) (2022) 900-908. https://doi.org/10.56042/ijms.v51i11.3506

37 Jinesh P T, Maheswarudu G, Sreesanth L, Ragesh N, Joby P J, *et al.*, Brief note on the ribbonfish *Tentoriceps cristatus* from the southwest coast of India, *Mar Fish Infor Serv, T&E Ser*, 234 (2017) 27-27. http://eprints.cmfri.org.in/id/eprint/13063

38 Anuraj A, Kamath A H, Jeena N S, Sajeela K A, Pal M, *et al.*, Report on crested hair tail *Tentoriceps cristatus* (Trichiuridae) from Goa, *Mar Fish Infor Serv, T&E Ser*, 252 (2022) p. 34. http://eprints.cmfri.org.in/16357/

39 Rizvi F A, Deshmukh V D & Chakraborty S K, Comparison of condition factor of the ribbonfish *Lepturacanthus savala* (Cuvier, 1829) and *Eupleurogrammus muticus* (Gray, 1831) from Mumbai coast, *J Mar Biol Assoc India*, 54 (1) (2012) 26-29. https://doi.org/10.6024/jmbai.2012.54.1.01316-04

40 Burhanuddin A I, Iwatsuki Y, Yoshino T & Kimura S, Small and valid species of *Trichiurus brevis* Wang and You, 1992 and *T. russelli* Dutt and Thankam, 1966, defined as the "*T. russelli* complex" (Perciformes: Trichiuridae), *Ichthyol Res*, 49 (3) (2002) 211-223.

41 Mericas D, Feeding habits of the Atlantic cutlass fish *Trichiurus lepturus*, in the Gulf of Mexico, *Northeast Gulf Sci*, 4 (1981) 137-140. https://doi.org/10.18785/negs.0402.11

42 Lee S, Food and feeding habits of ribbonfishes, *Trichiurus japonicus* and *T. lepturus*, *Bull Inst Zool Acad Sin*, 17 (1978) 117-124.

43 Rajesh K M, Rohit P, Mini K G, Sathyavathi T & Hakeem M, *Seriolina nigrofasciata* (Ruppel, 1829), its fishery and biological aspects off south-west coast of India, *Indian J Fish*, 66 (2019) 9–16. https://doi.org/10.21077/ijf.2019.66.1.82727-02

44 Scacco U, Tiralongo F & Mancini E, Feeding in Deep Waters: Temporal and Size-Related Plasticity in the Diet of the Slope Predator Fish *Coelorinchus caelorhincus* (Risso, 1810) in the Central Tyrrhenian Sea, *J Mar Sci Eng*, 10 (2022) p. 1235. https://doi.org/10.3390/jmse10091235

45 Drazen J C & Sutton T T, Dining in the Deep: The Feeding Ecology of Deep-Sea Fishes, *Ann Rev Mar Sci*, 3 (9) (2017) 337-366. https://doi.org/10.1146/annurev-marine-010816-060543

46 Froese R & D Pauly (eds), *FishBase*. World Wide Web electronic publication. Accessed Online at: www.fishbase.org; (Accessed on April 2025).