J. Indian Soc. Coastal Agric. Res. 43(2):61-73(2025) https://doi.org/10.54894/JISCAR.43.2.2025.170423

An Evaluation Approach to Juvenile Catch Proportion in Dolnet (Stationary Bagnet): Insights from a Small - Scale Fishery along the Mumbai Coast

AKANKSHA, R. KUMAR, A.T. LANDGE*, K. RAMTEKE, A. IBURAHIM S. and S. RAWAT

ICAR - Central Institute of Fisheries Education, Mumbai - 400 061, Maharashtra, India

Received: 18.08.2025 Accepted: 20.12.2025

Fixed tapering stationary bagnet (dolnet) is a crucial method for traditional small-scale fishing practiced along the Maharashtra coast. Its passive fishing technique relies heavily on favorable currents for effectiveness. Despite its simplicity and cost-effectiveness, the dolnet leads to indiscriminate fishing practices, contributing to overfishing. This study focuses on assessing the juvenile estimation of two economically and ecologically important species, *Lepturacanthus savala* and *Coilia dussumieri*, caught in dolnets along the Mumbai coast. From January to June 2023, a total of 379 *Lepturacanthus savala* specimens (ranging from 15.4 cm to 66.2 cm total length) and 461 *Coilia dussumieri* specimens (ranging from 6.6 cm to 19.0 cm total length) were collected from dolnet catches in three major landing locations, namely Madh, Versova, and Manori. The analysis was done based on the length frequency data collected for both species from Madh, Versova and Manori. Manori consistently exhibited the highest juvenile percentages for both species, ranging from 68.18% to 100% for *Lepturacanthus savala* and 62.97% to 88.46% for *Coilia dussumieri*. Juvenile percentage for *Lepturacanthus savala* in Madh ranged from 60.71% to 100%, while in Versova it ranged from 30.43% to 57.89%. Also, the juvenile percentage for *Coilia dussumieri* ranged from 44.00% to 81.48% in Madh, while it ranged from 37.50% to 57.14% in Versova. These findings provide valuable data for informing future conservation and resource management strategies aimed at mitigating the impacts of dolnet fishing on these species. Enforcing a minimum legal mesh size larger than the currently used 8 - 12 mm in the cod-end, and spatial management in dolnet fisheries is essential to minimize juvenile exploitation, thus enhancing the spawning stock biomass and ensuring sustainable stock recruitment along the Mumbai coast.

(***Key words:*** *Coilia dussumieri, Dolnet, Juvenile, Lepturacanthus savala, Resource management*)

The "dolnet" represents a stationary bag net tailored for deployment in regions marked by potent tidal flows, ensuring its opening consistently faces the direction of the tide. Its operation involves the strategic lowering and retrieval of the net in sync with the tidal cycle. The net's effectiveness depends significantly upon the strength of the tidal current. Acting like a sieve, the bag net traps the targeted fish, while the relentless force of the tidal current acts as a hindrance, thus, inhibiting their escape (Bapat, 1970).

The dolnet fishing technique is widely practiced along the northwest coast of India, particularly in Maharashtra and Gujarat states (Khan, 1986). In Maharashtra's coastal regions, dolnet fishing stands as a traditional method for capturing Bombay duck and various other fish species. Its adoption has played a pivotal role in sustaining the economic livelihoods of a significant segment of Maharashtra's fishing community (Raje and Ramamurthy, 1990). The catch profile of dolnet fishing at the Bhayander estuary in Maharashtra predominantly includes diverse species such as *Harpadon nehereus*, *Coilia dussumieri*, *Lepturacanthus savala*, *Johnius amblycephalus*, *Mystus gulio*, *Parapenaeopsis sculptilis*, *Charybdis callianassa*, *Enhydrina schistosa*, *Arius maculatus*, and *Acetes indicus* (Pradhan *et al.,* 2019).

While economically beneficial for fishers, the operation of bag net fisheries has prompted concerns regarding responsible fishing practices (Kumawat *et al.,* 2015). The inclusion of small mesh size (8mm) in the cod end section (khola) of the dol net has led to the inadvertent capture of numerous juvenile fish

**Corresponding author:* E-mail: ashalandge@cife.edu.in

species (Iburahim *et al.,* 2017). This fishing technique is predominantly employed by poor fishermen and contributes to the exploitation of juveniles in coastal and estuarine environments (Islam *et al.,* 2004). The indiscriminate nature of dolnet fishing poses significant risks of enduring environmental repercussions, which outweigh the immediate economic gains. Despite these apprehensions, dolnet usage persists along the northwest coast of India, primarily due to the absence of alternative livelihood options for impoverished fishermen who heavily depend on it (Ahmed and Troell, 2010).

L. savala and *C. dussumieri* are important components in dolnet fisheries along the Mumbai coast, as they represent significant dietary staples locally, commonly consumed either fresh or dried. Furthermore, their presence contributes to maintaining ecological equilibrium within the oceanic food web, highlighting their ecological importance.

The Trichiuridae family constitute of the ribbonfish species found in Indian waters, comprising four main species: *Trichiurus lepturus*, *L. savala*, *Eupleurogrammus intermedius*, and *Eupleurogrammus muticus*, with *T. lepturus* and *L. savala* being the most prevalent (Pakhmode *et al.,* 2013). These fish are characterized by schooling behavior, are pelagic in habitat, and undertake migratory journeys (Lazarus *et al.,* 1992; Pakhmode and Mohite, 2016). Ecologically, ribbonfishes play a pivotal role as apex predators, crucial for regulating the populations of species at lower trophic levels. In recent times, *L. savala* has emerged as the predominant species of ribbon fish captured in dolnet fishing operations along Mumbai coast.

C. dussumieri, known as the Gold spotted grenadier anchovy in England, mandeli in Maharashtra and Gujarat, and "*oluua maach*" in the coastal districts of Bangladesh, has gained significant regional recognition and popularity (Nurul and Zafar, 2004; Shingadia, 2014). Along the Saurashtra coast of the Arabian Sea, *C. dussumieri* is abundantly available and localized, primarily concentrated within a narrow belt spanning 45 km at depths ranging from 20 to 70 meters (Manoj kumar and Dinesh babu, 1999). Stationary bag-nets, commonly referred as dolnet, are the predominant method used for catching *C. dussumieri* in this region, typically ranging from 35 to 60 meters in length and equipped with a 20 mm mesh cod end. The peak fishing season for this species along the Gujarat coast occurs from September to January. *C. dussumieri* displays migratory behavior, often forming large schools as they transition between open coastal areas and protected shallow regions to fulfil their reproductive and trophic requirements (Ghosh and Vase, 2022).

Despite numerous studies conducted on dolnet fishing techniques and the two targeted species, there remains a significant gap in information regarding month-wise analysis of juvenile captures in dolnet for *L. savala* and *C. dussumieri*. The current study endeavours to explore the adverse effects of dolnet fishing on fish populations, with a specific focus on the capture of juvenile fish. Through this targeted research, the study seeks to offer valuable insights into the frequency and distribution of juvenile captures of these particular species by dolnet fishing on a month-by-month basis, shedding light on the potential impact on these fish species population.

MATERIALS AND METHODS

For the present study involving the estimation of juvenile proportion of *Lepturacanthus savala* and *Coilia dussumieri*, monthly samples were collected from the dolnet landings at Versova, Madh, and Manori (Fig. 1) for a period of six months from January 2023 to June 2023. On each sampling day, vessels were selected on a random basis without prior bias toward catch size, ensuring representation of different boats. During each sampling, catches from multiple vessels were examined to reduce vessel-level bias, and subsamples were drawn directly from freshly landed catches before sorting or auctioning. Total length of each specimen was measured soon after they were collected in fresh condition. Total length for *L. savala* was measured from lower jaw tip to tail tip; and total length of *C. dussumieri* was measured from the tip of the snout to the tail tip. The fish were then dissected and the various gonadal stages for both males and females were recorded. The fish are classified as juveniles when they are caught before attaining their size at first sexual maturity (Najmudeen and Sathiadhas, 2008).

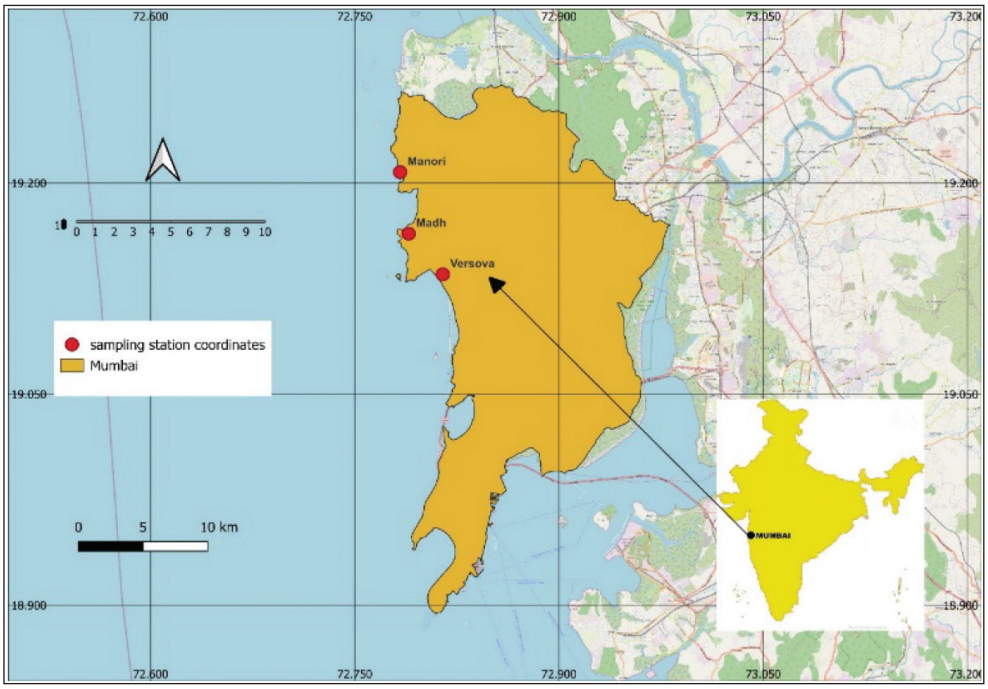

Fig. 1. *Sampling sites*

Length frequency data collected were analyzed to derive length at first maturity and percentage of fishes caught below the length at first maturity. The length at first maturity was determined by plotting cumulative percentage of mature fish – III and IV stages in male and female against lengths (James and Badrudeen, 1981).

RESULTS AND DISCUSSION

A total of 379 specimens of *Lepturacanthus savala* were recorded in the dolnet catches from landing location namely Madh, Versova, and Manori of Maharashtra, spanning a total length range of 15.4 cm to 66.2 cm (Table 1, Table 2 and Table 3). To assess maturity, the length at first maturity was calculated individually for male and female specimens (Fig. 2). For males, the length at first maturity was determined to be 49.8 cm, while for females, it was 50 cm. Consequently, individuals falling below these specified lengths were classified as juveniles.

During the six months from January 2023 to June 2023, the percentage of juvenile *L. savala* specimens was recorded across three distinct sampling sites. Notably, Madh and Manori consistently exhibited a higher percentage of juveniles within the catch compared to Versova across all observed months, as depicted in Table 7 and Fig. 3. Regarding the specific length range of juvenile individuals, those captured in Madh ranged from 15.4 cm to 44.4 cm in total length, while in Versova, the total length of juveniles varied between 30 cm and 48.6 cm. Similarly, in Manori, the length range extended from 19.2 cm to 47.6 cm (Table 3).

Table 1. *Total number of samples collected from the three sampling sites during January 2023 to June 2023*

Sampling sites	Total no. of specimens
Madh	123
Versova	127
Manori	129

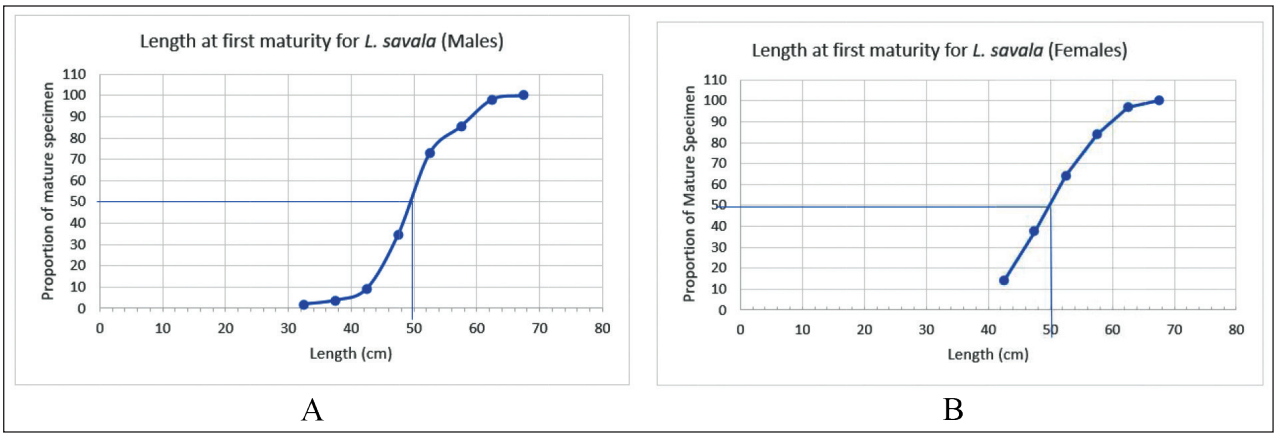

Fig. 2. A. *Length at first maturity for L. savala males;* ***Fig. 2. B.*** *Length at first maturity for L. savala females*

Table 2. *Month-wise number of samples of L.savala obtained from the three sampling Sites*

Month	Number of specimens from Madh	Number of specimens from Versova	Number of specimens from Manori
January'23	28	23	26
February'23	20	19	22
March'23	19	21	22
April'23	23	26	20
May'23	20	22	24
June'23	13	16	15

Table 3. *Length Range of L.savala obtained from the three sampling sites*

Sampling sites	Total length range (cm)		Mean ± SE (cm)
	Min	Max	
Madh	15.40	65.80	42.00±0.93
Versova	30.00	66.20	49.32±0.77
Manori	19.20	57.40	39.52±0.77

Table 4. *Total number of dolnet operated and number of fishing days for the three sampling sites*

Sampling sites	No. of dolnetters	Total no. of dolnet operated	No. of fishing days
Madh	70	70*2=140	16
Versova	23	23*2=46	16
Manori	10	10*2=20	16

The number of samples obtained was further raised to calculate the total number of juveniles for the particular sampling sites (Tables 4, 5 and 6).

*An average of 2 dolnets were operated per boat for all the sampling sites

*The dolnet were operated for 4 days per week

Raised total catch obtained for a particular landing site = (No.of specimen collected x Total no. of dolnet operated x No.of fishing days)

Table 5. *Month-wise total catch of L.savala from the three sampling sites*

Month	Total catch from Madh	Total catch from Versova	Total catch from Manori
January'23	62,720	16,928	8,320
February'23	44,800	13,984	7,040
March'23	42,560	15,456	7,040
April'23	51,520	19,136	6,400
May'23	44,800	16,192	7,680
June'23	29,120	11,776	4,800

The month-wise total catch of *L. savala* was consistently highest at Madh throughout the study period, followed by Versova and Manori. Catch levels at Madh peaked in January (62,720) and gradually declined towards June (29,120). Versova showed moderate fluctuations, with the highest catch recorded in April (19,136), while Manori consistently recorded the lowest total catch among the three sites (Table 5).

Table 6. *Month-wise total catch of L. savala from the three sampling Sites*

Month	Total juvenile catch from Madh	Total juvenile catch from Versova	Total juvenile catch from Manori
January'23	38,080	5,152	8,320
February'23	13,440	8,096	7,040
March'23	11,200	6,624	4,800
April'23	24,640	10,304	4,800
May'23	15,680	8,832	6,080
June'23	29,120	6,624	4,800

Juvenile catch formed a considerable proportion of the total catch at all landing centres. Madh exhibited particularly high juvenile landings, especially during April to June, with June showing complete juvenile dominance (29,120). Manori recorded 100% juvenile catch in January, February, and June, indicating highest landing of immature individuals during these months (Table 6).

Table 7. *Month-wise percentage of juveniles of L. savala from the three sampling sites*

Percentage of juveniles in the sample			
Month	Madh	Versova	Manori
January'23	60.71	30.43	100.00
February'23	70.00	57.89	100.00
March'23	68.42	42.86	68.18
April'23	91.30	53.85	75.00
May'23	90.00	54.55	79.17
June'23	100.00	56.25	100.00

The percentage analysis further confirms intensive juvenile exploitation. Madh recorded very high juvenile proportions, exceeding 90% during April - June. Versova showed relatively lower but still considerable juvenile percentages (30.43-56.25%). Manori displayed extreme juvenile dominance in multiple months, including a complete juvenile occurrence (100%) in January, February, and June (Table 7).

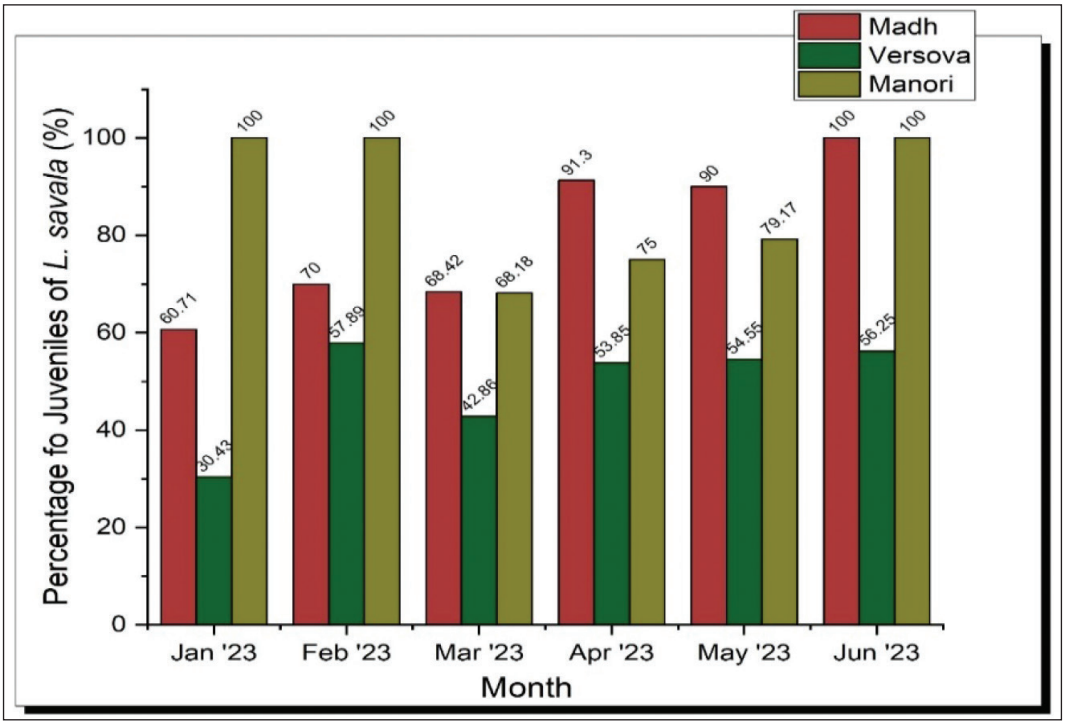

Fig. 3. *Month-wise percentage of juveniles of L. savala from three sampling sites*

In the dolnet catches from Madh, Versova, and Manori, a total of 461 specimens of *C. dussumieri* were documented, covering a total length range of 6.6 cm to 19.0 cm (Tables 8 and 9). To determine maturity, the length at first maturity was calculated separately for male and female specimens of *C. dussumieri*. It was observed that *C. dussumieri* reaches first maturity at a total length of 14.2 cm for males and 14.4 cm for females (Fig. 4). Consequently, individuals measuring below these specified lengths were systematically recorded

and categorized as juveniles. Over the course of six months and across the three designated sampling sites, the percentage of juvenile *C. dussumieri* specimens was documented (Table 13, Fig. 5).

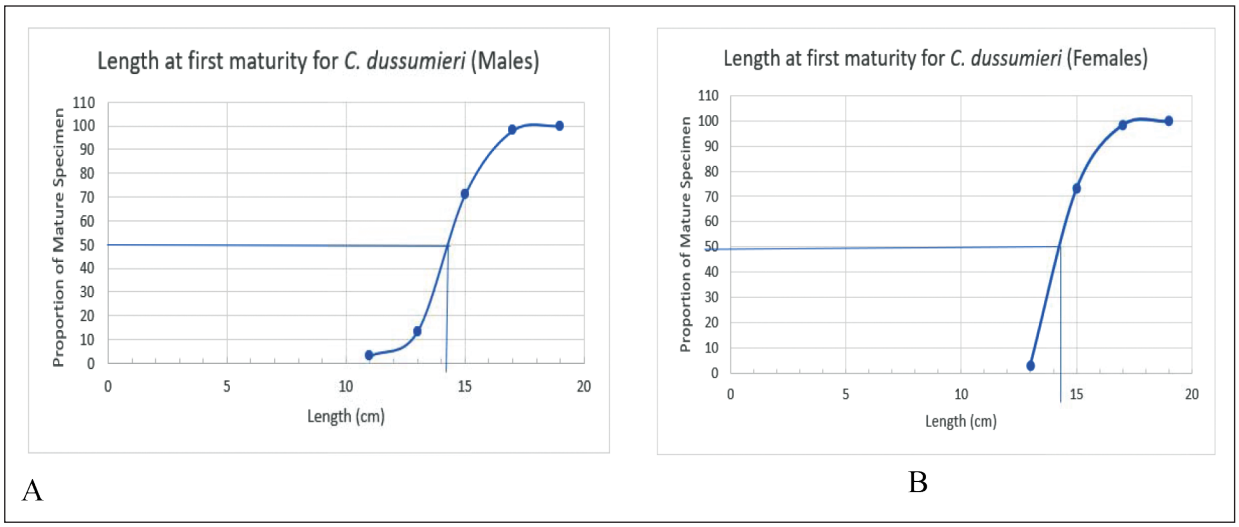

Fig. 4. A. *Length at first maturity for C. dussumieri males;* ***Fig. 4. B.*** *Length at first maturity for C. dussumieri females*

Table 8. *Total number of samples of C. dussumieri obtained from the three sampling sites*

Sampling sites	Total No. of specimens	No.of males	No.of females	No. of indeterminates
Madh	143	67	54	22
Versova	157	75	51	31
Manori	161	64	56	47

Table 9. *Length range of C. dussumieri obtained from the three sampling sites*

Sampling sites	Total length range (cm)		Mean ± SE (cm)
	Min	Max	
Madh	6.6	17.0	13.51±0.16
Versova	9.7	19.0	14.39±0.15
Manori	7.9	17.8	12.95±0.15

Table 10. *Month-wise number of samples of C. dussumieri obtained from the three sampling sites*

Month	Number of specimens from Madh	Number of specimens from Versova	Number of specimens from Manori
January'23	31	28	35
February'23	19	22	22
March'23	25	27	27
April'23	14	26	30
May'23	27	24	27
June'23	27	30	26

Table 11. *Month-wise total catch of C. dussumieri from the three sampling sites*

Month	Total catch from		
	Madh	Versova	Manori
January'23	69,440	20,608	11,200
February'23	42,560	16,192	7,040
March'23	56,000	19,872	8,640
April'23	31,360	19,136	9,600
May'23	60,480	17,664	8,640
June'23	60,480	22,080	8,320

The total catch was consistently highest at Madh throughout the study period, with peak landings observed in January (69,440) and again in May and June (60,480 each). Versova exhibited comparatively moderate catch levels, while Manori recorded the lowest total catch among the three centres across all months (Table 11).

Table 12. *Month-wise total juvenile catch of C. dussumieri from the three sampling sites*

Month	Total juvenile catch from Madh	Total juvenile catch from Versova	Total juvenile catch from Manori
January'23	53,760	11,776	8,960
February'23	20,160	6,624	6,080
March'23	24,640	8,832	5,120
April'23	24,640	8,096	7,680
May'23	38,080	6,624	6,720
June'23	49,280	10,304	7,360

Juvenile catch constituted a significant proportion of the total landings at all sites. Madh showed particularly high juvenile landings during January (53,760) and June (49,280). Manori displayed consistently high juvenile contributions, especially in February (81.82%) and June (88.46%). Versova recorded comparatively lower juvenile percentages, although juvenile dominance was still notable in several months (Table 12).

Table 13. *Month wise percentage of juveniles of C. dussumieri from the three sampling sites*

Month	Percentage of juveniles in the sample		
	Madh	Versova	Manori
January'23	77.42	57.14	80.00
February'23	47.37	40.91	81.82
March'23	44.00	44.44	44.44
April'23	78.57	42.31	66.67
May'23	62.96	37.50	62.96
June'23	81.48	46.67	88.46

The percentage analysis indicates considerable spatial and temporal variation in juvenile exploitation. Madh and Manori frequently recorded juvenile proportions exceeding 60-80%, whereas Versova generally showed moderate juvenile representation (approximately 37-57%). These findings suggest significant juvenile removal of *C. dussumieri* across all three dolnet landing centres, with particularly high intensity at Madh and Manori during specific months (Table 13).

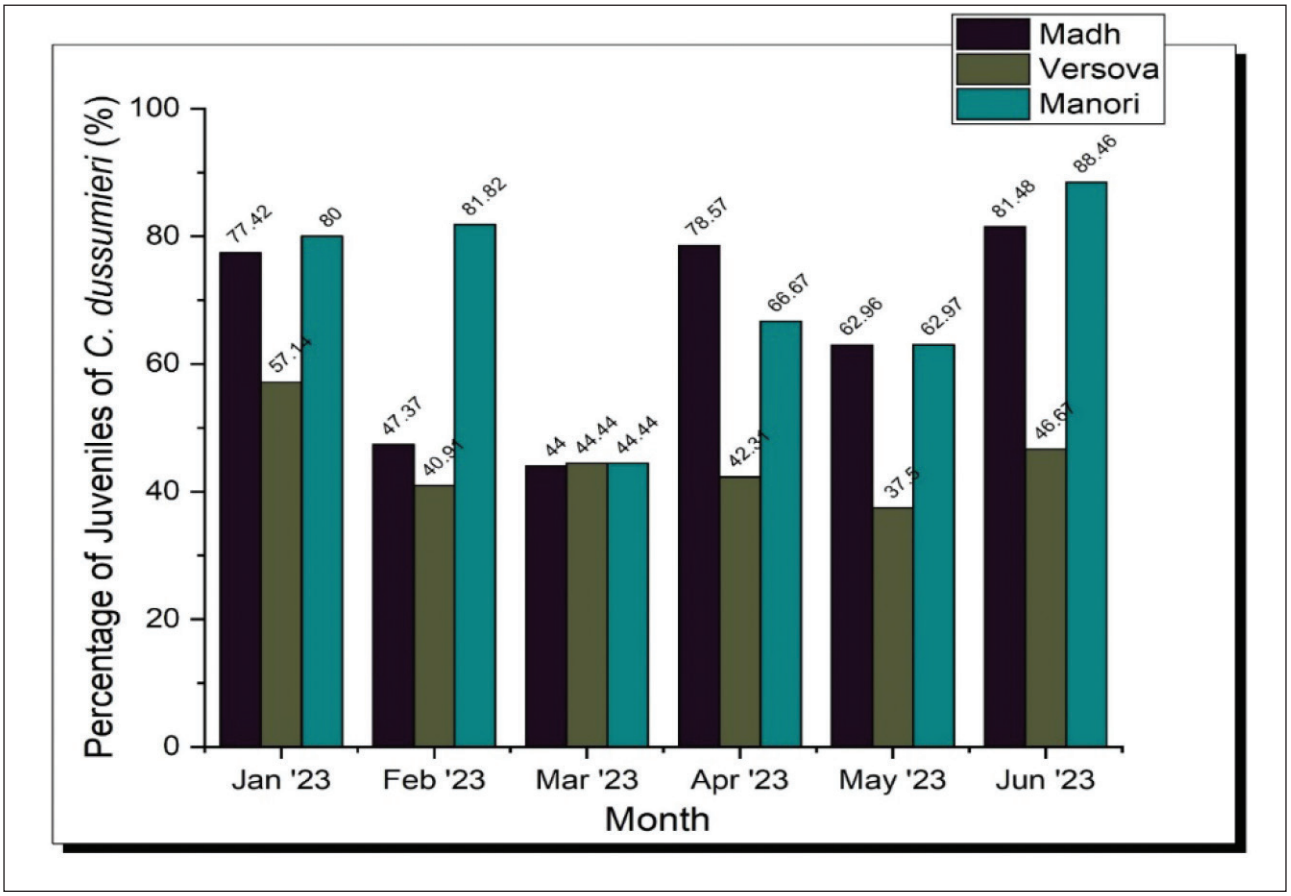

Fig. 5. *Month-wise percentage of juveniles of C. dussumieri from three sampling sites*

Notably, Manori consistently displayed the highest juvenile percentage within the catch for most of the observed months, with the exception of April. In contrast, both Versova and Madh exhibited a relatively lower count of juveniles across the observed months. This conclusion was further strengthened by performing a chi-square test of independence on the pooled catch data for all months to compare juveniles from the respective landing centres.

A chi-square test of independence revealed a highly significant association between landing centre and juvenile occurrence for *L. savala* (χ^2 = 22,229, df = 2, $p < 0.001$). The proportion of juveniles differed significantly among Madh, Versova, and Manori, with Manori exhibiting a markedly higher juvenile contribution to the total catch compared to the other two landing centres. Similarly, chi-square test of independence revealed a highly significant association between landing centre and juvenile occurrence for *C. dussumieri* (χ^2 = 13,188, df = 2, $p < 0.001$). The proportion of juveniles differed significantly among Madh, Versova, and Manori, indicating spatial variation in juvenile exploitation within the dolnet fishery.

A B

Fig. 6. A. *Juvenile specimen of L. savala*

Fig. 6. B. *Juvenile specimen of C. dussumieri*

Earlier, Ratheesh *et al.* (2019) investigated the temporal fluctuations in the catch composition of stationary bagnets along the Maharashtra coast in correlation with environmental factors and reported that while spatial variations in various resources exhibited no significant differences, temporal variations were found to be noteworthy for all the environmental variables. In the current research, we conducted a study on the monthly percentage of juvenile *L. savala* and *C. dussumieri* specimens captured using dolnet at Madh, Versova, and Manori, also considering the spatial variation in their juvenile catch among the three landing centres. For *L. savala*, the length at first maturity calculated for males is 49.8 cm and for females is 50 cm. Consequently, individuals below the length at first maturity were classified as juveniles. Earlier Rizvi *et al.* (2003) reported the length at first maturity of *L. savala* from Mumbai waters to be 51.7 cm. Among the study locations, Manori consistently exhibited the highest percentage of juveniles in the catch throughout all the study months, whereas Versova displayed a lower count of juveniles.

The variance in the proportion of juvenile specimens between Versova and Manori sites could be potentially attributed to differences in fishing methods utilized at each location. Versova relies predominantly on multi-day dolnetters operating in deeper waters, which may result in a catch composition skewed towards larger, mature individuals. Conversely, Manori employs single-day dolnetters equipped with a smaller mesh size, typically ranging from 8 mm to 12 mm. This variation in gear and mesh size is likely a key factor contributing to the higher prevalence of juvenile specimens in the catch from Manori.

For *C. dussumieri*, the calculated length at first maturity is 14.2 cm for males and 14.4 cm for females. Earlier, Ghosh and Vase (2023) conducted research on *C. dussumieri* from the Saurashtra coast, revealing that males reach first maturity at 14.5 cm, while females achieve it at 14.7 cm. Throughout the study period, Manori consistently exhibited the highest percentage of juveniles in catches across most months, except for April, while Madh and Versova reported comparatively lower juvenile counts. Versova consistently displayed the lowest juvenile percentage for all months. In Manori, near-shore fishing operations employ traditional dolnet with notably small mesh sizes (8 mm -12 mm), likely contributing to this trend. Conversely, Versova predominantly utilizes multi-day dolnetters operated in deeper waters. Gadgil (1967) elucidated *C. dussumieri* dynamic distribution, indicating that smaller specimens tend to inhabit shallower coastal waters, whereas larger individuals are more prevalent offshore. Bal and Joshi (1956) highlighted the offshore migration of adult *C. dussumieri* for spawning. Specifically, in Madh and Manori, maximum juvenile presence was documented in June'23, possibly influenced by the observed peak breeding season in March'23. In contrast, Versova

exhibited its highest juvenile count in January'23 due to predominant multi-day dolnet operations in deeper waters. Given consecutive months serving as the spawning season for *C. dussumieri*, the catch is likely to contain a higher proportion of mature and larger individuals during this period. The recruitment of smaller-sized fish in deeper waters takes time, potentially leading to an increase in juvenile percentage in Versova catches in consecutive months after June.

Several earlier studies have also documented the occurrence of juvenile catches of various species in dolnet fisheries. Khan (1987) highlighted the capture of *Harpadon neherius* juveniles sized between 45-60 mm, with the May period witnessing the landing of approximately 290 tons through dolnet operations. Josekutty and Sundaram (2004) documented the occurrence of juvenile *Parastomateus niger* within dolnet landings at Trombay, Mumbai. Furthermore, Chavan and Sundaram (2005) observed a substantial landing of juvenile groupers sized between 40 and 70 mm through dolnetting activities at New Ferry Wharf.

Kumawat *et al.* (2015) also reported that at present, a distinct lack of dedicated policies and regulations exists to facilitate the sustainable management and development of bagnet fishery resources. Iburahim *et al.* (2017) has also emphasized a concerning factor regarding the employment of small cod end mesh size contributing to reduced juvenile survivability.

CONCLUSION

The bagnet is a traditional and prevailing fishing method within Maharashtra. Dolnet fishing is predominantly carried out in areas influenced by strong tidal currents, where the stationary bag net remains aligned with tidal flow. Although this traditional fishing method is widely practiced along the northwest coast of India, particularly in Maharashtra and Gujarat, the absence of regulated mesh sizes has made it largely non-selective, leading to substantial juvenile capture. This issue highlights the importance of assessing the proportion of juvenile catch of targeted species within the net. Evaluating the juvenile catch proportion is essential for understanding the impact of dolnet fishing on fish populations and informing strategies to mitigate its unintended consequences on juvenile fish populations and overall marine ecosystem health.

The present assessment of juvenile proportions of *Lepturacanthus savala* and *Coilia dussumieri* indicates considerable juvenile exploitation across the three landing centres, with Manori consistently recording higher juvenile dominance in several months. Higher juvenile occurrence during post-spawning months further suggests seasonal vulnerability of recruits to dolnet operations.

These findings highlight the need for site and season-specific management interventions specifically for the major dolnet species like *L. savala* and *C. dussumieri*, which form major local food sources commonly consumed in fresh or dried forms. These species also hold considerable economic and ecological significance. So, introducing scientifically determined minimum mesh size regulations, particularly during peak juvenile abundance months, would reduce the capture of immature individuals. Presently, there are no constraints in place pertaining to mesh dimensions, catch quotas, for these traditional bagnets, and there have been no established legal thresholds to regulate the dolnet fishery. Seasonal restrictions or partial closures in areas such as Manori, where juvenile dominance is consistently high, may further support stock replenishment. Additionally, establishing minimum legal size limits for the major dolnet species, along with routine monitoring of landing centres, would improve recruitment sustainability. Also, strengthening co-management approaches involving local fishing communities will be critical for ensuring compliance and maintaining both ecological resilience and economic viability of the dolnet fishery along the Maharashtra coast.

ACKNOWLEDGEMENT

Authors would like to acknowledge ICAR-Central Institute of Fisheries Education, Mumbai for providing me the resources to conduct my research.

CONFLICTS OF INTEREST

Authors declare there is no conflict of interest.

REFERENCES

Ahmed, N. and Troell, M. (2010). Fishing for prawn larvae in Bangladesh: An important coastal livelihood causing negative effects on the

environment. *Ambio* **39**: 20-29.

Bal, D.V. and Joshi, M.S. (1956). Studies on the biology of *Coilia dussumieri* (Cuv. & Val.). *Indian Journal of Fisheries* **3**(1).

Chavan, B.B. and Sundaram, S. (2005). Occurrence of juveniles of groupers in dol net landings at New Ferry Wharf, Mumbai. *Marine Fisheries Information Service, Technical and Extension Series* (186): 10–11.

Gadgil, M. (1967). On some aspects of the biology of *Coilia dussumieri* (Cuv. and Val.). *Journal of the Bombay Natural History Society* **64**(1): 55-69.

Ghosh, S. and Vase, V. K. (2023). Reproductive and feeding biology of Goldspotted Grenadier Anchovy, *Coilia dussumieri* off Saurashtra Coast, Northern Arabian Sea. Thalassas: *An International Journal of Marine Sciences* **39**(1):157-168.

Iburahim, A., Pradhan, S.K., Nirmal, T., Ratheesh Kumar, R., Kamat, S. and Shenoy, L. (2017). Catch composition and discards in set bagnets of Karanja estuary, Raigad, Maharashtra. *Journal of Indian Fisheries Association* **44**: 17-29.

Islam, S., Malik, M.I., Hussain, S., Thursamy, R., Shujahat, M. and Sajjad, M. (2018). Motives of excessive Internet use and its impact on the academic performance of business students in Pakistan. *Journal of Substance Use* **23**(1): 103-111.

James, P.S. B.R. and Badrudeen, M. (1981). Biology and fishery of silverbelly *Leiognathus dussumieri* (Valenciennes) from Gulf of Mannar. *Indian Journal of Fisheries* **28**(1&2): 154-182.

Josekutty, C.J. and Sundaram, S. (2004). On the occurrence of juveniles of pomfrets in dol net catches at Trombay, Mumbai. *Marine Fisheries Information Service*, *Technical and Extension Series* (181): 10.

Khan, M.Z. (1986). Dol net fishery off Nawabunder (Gujarat). *Fishery Technology* **23**: 92-99.

Khan, M.Z. (1987). A note on the dol-net fishery off Jaffrabad (Gujarat) with special reference to Bombay duck, from 1979-80 to 1981-82. *Indian Journal of Fisheries* **34**(2): 188-192.

Kumawat, T., Shenoy, L., Chakraborty, S.K., Deshmukh, V.D. and Raje, S.G. (2015). Compliance of bag net fishery of Maharashtra coast, India with Article 7 of the FAO Code of Conduct for Responsible Fisheries. *Marine Policy* **56**: 9-15.

Lazarus, S., Scariah, K.S., Khan, M.Z. and Velayudhan, A.K. (1992). Present status of exploitation of fish and shellfish resources: Ribbonfishes. *CMFRI Bulletin* **45**: 121-132.

Manojkumar, B. and Dineshbabu, A.P. (1999). 'Dol'net fisheries of the Saurashtra coast. *Marine Fisheries Information Service, Technical and Extension Series* **161**: 1-8.

Nurul Amin, S.M. and Zafar, M. (2004). Studies on age, growth & virtual population analysis of *Coilia dussumieri* from the neretic waters of Bangladesh. *Journal of Biological Sciences* **4**(3): 342-344.

Pakhmode, P.K. and Mohite, S.A. (2016). Study of gonad development using ova diameter analysis in ribbonfish, *Lepturacanthus savala* (Cuvier, 1829). *IOSR Journal of Agriculture and Veterinary Science* **9**(2): 01-05.

Pakhmode, P.K., Mohite, S.A., Naik, S.D. and Mohite, A.S. (2013). Length frequency analysis and length-weight relationship of ribbonfish, *Lepturacanthus savala* (Cuvier, 1829) off Ratnagiri coast, Maharashtra. *International Journal of Fisheries and Aquatic Studies* **1**(2): 25-30.

Pillai, S.K. (1983). Some observations on dol (bag) net fishery at Sassoon dock, Bombay. *Journal of the Bombay Natural History Society* **82**(3): 331-340.

Pradhan, S.K., Iburahim, S.A., Latha Shenoy, L.S., Ram Singh, R.S. and Nakhawa, A.D. (2019). Design and operational parameters of dol nets operated in Bhayander Estuary, Maharashtra.

Raje, S.G. and Ramamurthy, S. (1990). Cost and earning of two different sized 'Dolnet' boats at Versova (Bombay). *Marine Fisheries Information Service,*

Technical and Extension Series **104**: 6-8.

Ratheesh Kumar, R., Dineshbabu, A., Singh, V.V., Jaiswar, A.K., Shenoy, L., Shukla, S.P., Lekshmi, M. and Sreekanth, G.B. (2019). Temporal variations in catch composition of stationary bagnets along Maharashtra coast in relation to environmental factors. *Journal of Experimental Zoology India* **22**(1): 251-263.

Rizvi, A.F. and Deshmukh, V.D. (2003). Growth parameters of *Lepturacanthus savala* (Cuvier, 1829) from Mumbai waters.

Shingadia, H.U. (2014). Length-weight relationship and relative condition factor of *Coilia dussumieri* (Cuv. & Val.) from Neretic waters off the Mumbai Coast. *International Journal of Science and Research* **3**(5): 354-357.