No.2, July-December 2025

KALPAMATSYA

A Biannual Shark Science Digest from India

THE SHARK

ICAR-Central Marine Fisheries Research Institute
(Department of Agricultural Research and Education, Government of India)
P.B. No. 1603, Ernakulam North P.O., Kochi - 682 018, Kerala, India

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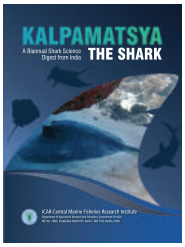

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No.2, July-December 2025

Published by

Dr. Grinson George
Director, ICAR–Central Marine Fisheries Research Institute

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From the Director's desk

As the second volume of Kalpamatsya – The Shark is brought forth, I am filled with a sense of happiness and excitement—happiness that the first volume was accepted wholeheartedly by its readers, and excitement that a long-held dream of a magazine focusing on sharks from the region is steadily moving forward. Based on the feedback received, I am satisfied that we have at least partially achieved our primary objective of showcasing research and conservation efforts related to sharks in India.

In the present scenario, shark conservation has become increasingly critical. Sharks face mounting pressures from overfishing, bycatch in commercial fisheries, habitat degradation, and the impacts of climate change. Conservation is therefore not an easy task, especially for species like sharks that are often caught alongside other commercially important fishes. Effective conservation requires attitudinal shifts from both producers and consumers, supported by education, awareness, and science-based management.

With this expanded edition of Kalpamatsya, we aim to reach both producers and consumers by highlighting conservation concerns while also providing a strong scientific foundation for informed decision-making. It is heartening to note that contributions have come from conservation practitioners as well as fishermen leaders, indicating a growing recognition of the importance of shark conservation. Despite increasing research efforts, there is still much to learn about these fascinating yet highly threatened fishes, particularly in the context of their conservation and sustainable management.

I hope this volume will serve as a valuable resource for students, academics, policymakers, and professionals interested in marine life, and will contribute meaningfully to ongoing discussions on shark conservation. While the current issue includes a larger number of articles and research contributions from ICAR–CMFRI, we look forward to expanding this platform further by inviting contributions from shark researchers across the country and the subcontinent.

I wish Team Kalpamatsya continued success and look forward to a new year dedicated to advancing research, awareness, and conservation of sharks.

Dr Grinson George
Director
ICAR-CMFRI

Editor's voice

Dear Readers,

It is with a profound sense of optimism that we present the second edition of Kalpamatsya: The Shark, India's platform for advancing research, conservation, and action for sharks, rays, and chimaeras. At a pivotal moment in marine biology, rapid advances, high-resolution data, and global collaboration are reshaping a once-misunderstood field. This edition brings together emerging knowledge, international initiatives, and the collective commitment driving renewed momentum to safeguard these vital species. Once viewed largely through the lens of fear and misconception, sharks and their allied groups are now widely acknowledged as essential components of marine ecosystems. Functioning as apex and predators, they shape trophic dynamics, regulate species composition, and provide valuable insights into ecosystem conditions across India's varied marine landscapes from near-shore waters and coral reefs to pelagic zones and the deep sea. In recent years, elasmobranch research in India has advanced considerably, supported by innovations such as molecular taxonomy, digital morphometrics, and improved population modelling techniques. These developments have enhanced understanding of population trends, life-history traits, movement patterns, and have led to the identification of new and previously undocumented species. Nevertheless, despite these scientific and technological gains, increasing pressures from unsustainable exploitation, habitat degradation, bycatch mortality, and oceanic changes linked to climate change continue to threaten the long-term survival of these ecologically critical species. Kalpamatsya: The Shark addresses these challenges through an integrated approach that combines cutting-edge scientific research with adaptive fisheries management, incorporating emerging tools such as advanced stock assessment models, genetic and molecular techniques, electronic monitoring, and data-driven decision-support systems to strengthen elasmobranch conservation and sustainable use. This edition places particular emphasis on recent advancements in shark and ray research at the ICAR–Central Marine Fisheries Research Institute (ICAR-CMFRI), showcasing how science-based evidence informs national conservation policies and management frameworks. We are also excited to have an article from Ajith Shankhumukham who has shared his experiences in rescuing stranded whale sharks. By strengthening linkages between science, policy, and coastal communities, we hope Kalpamatsya: The Shark will continue to contribute meaningfully to India's evolving elasmobranch conservation landscape towards resilient oceans and a secure future for these vibrant marine species.

Dr. G. B. Purushottama
Senior Scientist

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Research Snapshots

Advancing our understanding of shark and ray life history

In the first issue of *Kalpamatsya*, we documented the incidental landings of protected elasmobranchs and rare species in India, aiming to shed light on those often overlooked in conventional fisheries assessments and to underscore their vulnerability within multi-gear, multi-species fisheries. In this issue, we turn our focus to the biology of elasmobranchs—their diverse reproductive strategies, extended gestation periods, feeding ecology, and distinctive life-history traits. These characteristics not only make elasmobranchs one of the most vulnerable groups in the marine realm but also one of the most fascinating as well.

The Enigmatic Broadfin Shark

The broadfin shark, *Lamiopsis temminckii*, is a rare and elusive species, assessed as "Endangered" by the IUCN. Once thought to be more common, it is now a rare sight in commercial fish catches, making every encounter a valuable opportunity for scientific investigation. Researchers from ICAR-CMFRI were able to provide the first detailed biological information on this endangered shark from Indian waters.

Based on the examination of over 200 specimens, scientists estimated that female sharks reached sexual maturity at a size of approximately 143.0 cm, while males matured at a slightly smaller size of 136.8 cm. The broadfin shark is viviparous, giving birth to 2 - 8 pups per litter, which are born at a size of 41.8–65.0 cm. This relatively low reproductive output makes the species particularly vulnerable to overfishing.

The broadfin shark feeds on a wide variety of prey, showing a clear preference for teleost fishes, while also consuming crustaceans and cephalopods. Its favored prey include eels, ribbonfishes, and several species of crabs and shrimps. This varied diet highlights the broadfin shark's role as an important predator in the coastal ecosystem.

(Source: Akhilesh *et al.,* 2017)

The Smooth-tooth Wedgefish: A Subtle Predator of the Seabed

The smooth-tooth wedgefish, *Rhynchobatus laevis*, is one of the largest and most impressive of the batoids, a group of cartilaginous fishes that includes rays and skates. Despite their size and vulnerability to fishing pressure, very little was known about their biology from India. Recently scientists from ICAR-CMFRI were able to shed light on the biology of this species based on their examination of over 300 individuals. The study revealed

significant differences between sexes with females reaching up to 290 cm and males 225 cm in total length. This sexual dimorphism is also reflected in their age at maturity. Females mature at a length of 190 cm, while males mature at a much smaller size of 140 cm.

The smooth-tooth wedgefish is a viviparous species, with females giving birth to 4 to 10 embryos per litter. The size at birth was estimated to be between 44 and 50 cm. The reproductive cycle does not appear to follow a strict seasonal pattern, with gravid females observed in both the pre-monsoon and monsoon seasons.

Stomach content analysis revealed that this species is a formidable predator, with a diet consisting mainly of teleost fishes (83.4%) and crustaceans (15.1%). This information is crucial for understanding their ecological role and for developing effective management strategies.

(Source: Purushottama *et al.*, 2020a)

A Closer Examination of the Bowmouth Guitarfish

The bowmouth guitarfish, *Rhina ancylostomus*, is a Critically Endangered species with a unique and striking appearance. It is a fascinating blend of shark and ray, with a wide, flattened head and a shark-like body. Due to its rarity and vulnerability, there is a pressing need to understand its biology and ecology to inform conservation efforts. Researchers at ICAR-CMFRI were able to provide crucial new information on this enigmatic species through a study published in 2022.

This study was based on data from 369 individuals, from which the research team estimated sexual maturity in female bowmouth guitarfish at a size of 183 cm and males at 164 cm. Like many other elasmobranchs, this species is viviparous, with females having two functional ovaries and a reproductive cycle where the ovarian cycle and gestation run concurrently. The number of embryos per litter ranges from 2 to 8, and the size at birth was estimated to be between 44 and 50 cm.

The bowmouth guitarfish is a specialized predator, with a diet that reflects its bottom-dwelling habit. It primarily feeds on crustaceans and teleost fishes. By the time this information was published, the species was included in Schedule I of the Wild Life (Protection) Amendment Act, 2022, thereby prohibiting its capture in the wild. Hence the information brought forth by ICAR-CMFRI researchers will probably be the most comprehensive one on this species for the near future from India and will be instrumental in developing conservation strategies that minimize the capture of this species in commercial fisheries.

(Source: Purushottama *et al*., 2022)

The Grey Sharpnose Shark: A Common Species with a Complex Life

The grey sharpnose shark, *Rhizoprionodon oligolinx*, is a common inhabitant of the coastal waters of the Arabian Sea. Despite its abundance, detailed information on its reproductive biology has been lacking. A recent study by ICAR-CMFRI scientists has filled this knowledge gap, providing a comprehensive overview of the life history of this important species.

This study, based on the examination of over 700 individuals, has revealed key details about the reproductive biology of the grey sharpnose shark. The size at which they reach sexual maturity is estimated to be 62.3 cm for females and 59.5 cm for males. The species is viviparous, with litter sizes ranging from 1 to 7 embryos. Similar to many other sharks, the mother's size and the number of embryos she carries is positively correlated, with larger females producing larger litters.

The grey sharpnose shark is a voracious predator, with a diet that consists mainly of teleost fishes, crustaceans, and cephalopods. This study provides a detailed analysis of its feeding habits, which is essential for understanding its role in the marine food web and for managing the fisheries that interact with this species.

(Source: Purushottama *et al.*, 2017)

The Longtail Butterfly Ray: A Story of Sexual Dimorphism and a Voracious Appetite

The longtail butterfly ray, *Gymnura poecilura*, is a fascinating species that exhibits significant differences between the sexes, a phenomenon known as sexual dimorphism. A study by ICAR-CMFRI researchers has provided a detailed look into the reproductive biology and diet of this unique ray, revealing a story of female dominance and a voracious appetite .

One of the most striking findings of this study is the pronounced sexual dimorphism in size. Females grow to a much larger size than males, with the largest female recorded at 920 mm in disc width, while the largest male was only 550 mm. This size difference is also reflected in their maturity, with females reaching sexual maturity at a larger size (506.5 mm) than males (435.9 mm).

The longtail butterfly ray appears to be a year-round breeder, with neonates observed in multiple months. The average uterine fecundity was found to be 3.4 embryos per litter. The study also revealed that the feeding intensity of these rays increases with their body size. Their diet primarily consists of fish, which account for over 80% of their food intake. This voracious appetite highlights their importance as predators in the marine ecosystem.

(Source: Menon *et al.*, 2020)

The Bengal Guitarfish: A Lesser-Known Species in the Arabian Sea

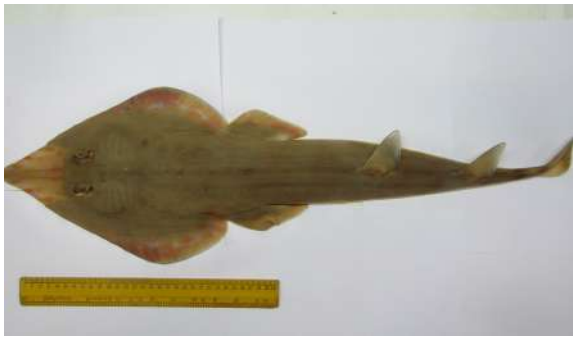
The Bengal guitarfish, *Rhinobatos annandalei*, is a little-known species of shovelnose ray that is often caught as bycatch in commercial fisheries. Despite its presence in the Arabian Sea, there has been a lack of detailed information on its biology. Researchers at ICAR-CMFRI have now provided the first comprehensive study of this species from the north-western coast of India, shedding light on its life history and ecological role.

Based on the examination of 593 specimens, the size at which these guitarfish reach sexual maturity has been estimated. For females, this milestone is reached at a total length of approximately 61.0 cm, while males mature at a slightly larger size of 63.3 cm. The Bengal guitarfish is a viviparous species, with litter sizes ranging from 2 to 11 embryos. The size at birth is estimated to be between 25.0 and 30.0 cm. The overall sex ratio was found to be skewed towards females, with a ratio of 1.6:1.

Stomach content analysis has revealed that the Bengal guitarfish primarily feeds on small invertebrates. The most important prey item was found to be *Solenocera* spp., a type of prawn. Other prey items included other species of prawns, squid, and sciaenid fishes. This information is crucial for understanding the species' role in the food web and for developing effective management strategies.

(Source: Purushottama *et al.*, 2020b)

The Critically Endangered Stripenose Guitarfish



The stripenose guitarfish, *Acroteriobatus variegatus*, is a critically endangered species that is endemic to the southern Arabian Sea region. Due to its vulnerability to

fishing pressure, there is an urgent need to understand its biology to inform conservation efforts. A recent study by ICAR-CMFRI researchers has provided the first insights into the reproductive biology of this species, based on the examination of a single gravid female.

The observed specimen was a gravid female measuring 67.2 cm in total length. The mode of reproduction in *A. variegatus* is aplacental yolk-sac viviparity, with a low uterine fecundity. The female was carrying two embryos, one male and one female. This low reproductive output makes the species particularly vulnerable to overfishing. This study provides the first description of the reproductive characteristics of this critically endangered species.

(Source: Wilson *et al*., 2020)

The Ornate Eagle Ray and the Mangrove Whipray: Study from the Gulf of Mannar

Recent landings of two threatened ray species, the ornate eagle ray (*Aetomylaeus vespertilio*) and the mangrove whipray (*Urogymnus granulatus*), from the Gulf of Mannar have provided new insights into their biology and have set new maximum size records for both species. These findings highlight the importance of monitoring the bycatch of commercial fisheries for rare and threatened species. The largest ornate eagle ray landed was a pregnant female measuring 384 cm in disc width and weighing 530 kg, a new global record for the species. The mangrove whipray landed was a spent female measuring 153 cm in disc width and weighing 150 kg, also a new maximum size record. The ornate eagle ray was found to be carrying three full-term embryos. The stomach of the eagle ray contained big-eye scad, while the mangrove whipray fed on a variety of fishes and octopus.

(Source: Remya *et al*., 2023)

Hidden Complexity in the Reproduction of the Spadenose Shark

The spadenose shark, *Scoliodon laticaudus*, is a common inhabitant of the coastal waters of the north-eastern Arabian Sea. Despite its abundance, there has been a lack of detailed information on its reproductive biology from this region. A recent study by ICAR-CMFRI scientists has provided a comprehensive overview of the reproductive strategy of this important species.

This study, based on the examination of over 1,200 individuals, has revealed key details about the reproductive biology of the spadenose shark. The size at which they reach sexual maturity is estimated to be 33.8 cm for males and 35.8 cm for females. The species is viviparous, with litter sizes ranging from 8 to 19 embryos. There is a positive correlation between the mother's size and the number of embryos she carries, with larger females producing larger litters. The study also identified two peak reproductive periods, in March-April and October-November.

(Source: Sen *et al*., 2018a)

The Milk Shark: A Year-Round Breeder with Seasonal Peaks

The milk shark, *Rhizoprionodon acutus*, is a commercially important species that has experienced a decline in catches. To better understand this species for effective management, ICAR-CMFRI researchers investigated its reproductive strategy in the north-eastern Arabian Sea, providing crucial data for conservation efforts.

Based on the analysis of 684 specimens, the study found that male and female milk sharks mature at nearly the same size, at total lengths of 61.5 cm and 61.3 cm, respectively. While the species breeds throughout the year, the research identified two peak breeding periods: one in February-March and another in October-November. A major parturition (birthing) event is presumed to occur in May. The uterine fecundity, or litter size, is influenced by the mother's body size and ranges from three to seven embryos per litter. This detailed reproductive information is vital for assessing the species' resilience to fishing pressure.

(Source: Sen *et al.*, 2018b)

The Milk Shark: A Voracious Predator with a Varied Diet

The milk shark, *Rhizoprionodon acutus*, is another common species of shark found in the coastal waters of the north-eastern Arabian Sea. A study by ICAR-CMFRI scientists has provided a detailed analysis of the feeding habits of this species, which is essential for understanding its role in the marine food web.

The study, based on the analysis of 684 specimens, revealed that the milk shark is a voracious predator with a diet that consists mainly of teleost fishes, followed by crustaceans. The most preferred prey items were clupeids, engraulids, and carangids. The study also found that there was a significant difference in the diet of juvenile and adult sharks, with juveniles feeding on a higher proportion of crustaceans. This information is crucial for understanding the trophic dynamics of the species and for developing effective management strategies.

(Source: Sen *et al.*, 2018c)

Reproductive Adaptation in Spadenose and Milk Sharks

To ensure reproductive success, sharks have evolved a variety of strategies. A fascinating adaptation was recently observed by ICAR-CMFRI scientists in the male spadenose shark (*Scoliodon laticaudus*) and milk shark (*Rhizoprionodon acutus*) from the coast of Gujarat. This discovery sheds new light on the breeding behavior of these coastal sharks.

The study revealed that the claspers—the male shark's copulatory organs—are modified. The terminal end of the clasper features an umbrella-like organ called a rhipidion, which morphologically resembles a webbed foot. This specialized structure is believed to help secure the clasper within the female's cloaca during mating, ensuring the successful transfer of sperm. The observation of many mature individuals with this feature near coastal waters provides valuable clues about the breeding season and areas for these species, contributing to our understanding of their reproductive ecology.

(Source: Sen *et al.*, 2020)

The Scalloped Hammerhead Shark: A Vulnerable Species in Indian Waters

The scalloped hammerhead shark, *Sphyrna lewini*, is one

of four hammerhead shark species found in India's marine fishery. Despite its ecological importance and vulnerability to overfishing, detailed information on its biology and fishery status has been limited. A comprehensive study by ICAR-CMFRI researchers has now provided crucial insights into the fishery dynamics and reproductive biology of this species along the Indian coast.

The length range of *S. lewini* in regular landings was 36-300 cm in total length (TL). The dominant size class was 30-100 cm TL, with 79.5% of males and 83.2% of females measured between 40 and 100 cm TL. The overall sex ratio was found to be 1.3:1 (Female:Male), with females dominating the catch. The length at first maturity of males was estimated at 168 cm, while females reached maturity at 239.6 cm. This significant difference in maturity sizes reflects the sexual dimorphism characteristic of this species. Fecundity ranged from 12-40 embryos, with a size at birth estimated at 36-45 cm TL.

Stomach content analysis revealed that bony fishes were the preferred prey, followed by cephalopods. This information is essential for understanding the ecological role of this apex predator and its impact on the marine food web.

(Source: Thomas *et al*., 2020a)

The Spadenose Shark of the Eastern Arabian Sea: A Fishery in Decline

The spadenose shark, *Scoliodon laticaudus,* is a small but significant component of the shark landings in the south-eastern Arabian Sea, primarily caught as bycatch in trawl nets. A study by ICAR-CMFRI provides a detailed look at its fishery and biological characteristics, highlighting a concerning decline and the need for sustainable management practices.

The average annual catch of the spadenose shark was estimated at 112 tonnes, making up about 13% of the total shark landing in the Karnataka region. The fishery primarily targets individuals in the 45–55 cm length group. The study determined that females mature at a total length of 32 cm and males at 33 cm. Stomach content analysis revealed that the spadenose shark is predominantly piscivorous, feeding mainly on fish. The findings indicate that the fishery for this species is declining, underscoring the need for management efforts to ensure its long-term sustainability.

(Source: Thomas *et al.*, 2020b)

The Giant Freshwater Whipray: A Rare and Endangered Species

The giant freshwater whipray, *Urogymnus polylepis*, is one of the world's largest and rarest freshwater fishes. It is listed as 'Endangered' on the IUCN Red List. A recent study by ICAR-CMFRI scientists has provided new observations of this species from the north-east coast of India, confirming its distribution and providing insights into its breeding biology.

The study reports on the observation of 13 specimens of the giant freshwater whipray from commercial fish landings. The disc width of the landed specimens ranged from 120 to 223 cm, and they weighed between 95 and 300 kg. All the observed specimens were mature, and three of the females were pregnant, with litter sizes ranging from 4 to 15 embryos. These observations provide further evidence for the breeding of this endangered species in the coastal waters of India and highlight the need for greater protection measures.

(Source: Sen *et al*., 2022)

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Success Stories

ICAR-CMFRI's role in live release of protected elasmobranchs

Widenose guitarfish release at Majali, Fish Landing Centre

Conservation begins at home (modifying a famous adage) and at ICAR-CMFRI we constantly strive to lead from the front in aiding shark conservation efforts. With increasing awareness on shark conservation, many times fishermen contact our researchers when they incidentally capture protected species. However many times information gets in too late to save the animal, but even these incidents provide opportunities to improve awareness among fishermen. In this section we share some success stories where researchers were able to release protected species back alive to the sea.

In September 2025, Dr. Mahesh, shark researcher at ICAR-CMFRI's Karwar station, was involved in the documentation and live release of the protected widenose guitarfish (*Glaucostegus obtusus*). This species is listed under Schedule I of the Indian Wildlife (Protection) Act, following the 2022 amendment, due to its sharply declining population. The widenose guitarfish, a small coastal elasmobranch inhabiting shallow waters and estuaries, is particularly susceptible to incidental capture in gillnets,

Widenose guitarfish release at Aligadda fish landing centre, Karwar

single-day trawls, hook-and-line fisheries, and shore seine operations. During his routine field visit to Majali fish landing centre on 19th September 2025, he observed two widenose guitarfish accidentally entangled in gillnets. Both individuals were mature females measuring 60 cm and 78 cm in total length and were alive at the time of landing. The fisherwomen, unaware of the protected status of the species, were initially intending to sell the fish locally. Recognising this as an opportunity for outreach, Dr. Mahesh, along with Mr. Nagaraj M. Durgekar, supportive staff, engaged with the fisherwomen and others present at the beach to explain the legal protection afforded to the species. Following this interaction, the fisherwomen agreed to release both specimens back into the sea and were encouraged to do the same for any future accidental captures.

A few days later on 26 September 2025 at Aligadda beach, Karwar, fishermen inadvertently caught another widenose guitarfish and being conversant with its protected status contacted Dr. Mahesh for his guidance. Dr. Mahesh and his team assisted in the safe release of the specimen, which was a mature female measuring 107 cm in length. Dr. Mahesh noted that such proactive responses from fishers are encouraging and reflect the positive impact of sustained awareness efforts.

Community awareness leads to safe release of a widenose guitarfish

Similar to the Karwar live releases, a successful live release of *G. obtusus* was achieved at Vizhinjam in Kerala. In October 2025, an incidental entanglement of a live G. obtusus was recorded at the Vizhinjam fishing harbour, Kerala. The specimen, caught inadvertently in a traditional shore seine-"tattumadi", was landed by local fishers who were initially unaware of the legal protection afforded to the species. The event was promptly reported to scientists at the Vizhinjam Regional Centre of ICAR-CMFRI. The specimen was a mature female measuring 95.3 cm in total length and weighed 4.13 kg. The specimen was in good physical condition with no external injuries indicative of prolonged gear entanglement. Following verification of the specimen's protected status, ICAR–CMFRI scientists, with full cooperation from the local fishing community, ensured its safe transfer to nearby coastal waters. The guitarfish was released alive in the sandy nearshore habitat off Kovalam, enabling its continued survival and potential contribution to the population.

Safe Release of a Protected Bottlenose Guitarfish in Minicoy, Lakshadweep

Researchers from ICAR-CMFRI were also involved in the safe release of the protected bottlenose guitarfish (*Rhynchobatus cf. australiae*) at Minicoy Island, Lakshadweep, on 4 December 2025. The bottlenose guitarfish (*Rhynchobatus cf. australiae*) is a demersal elasmobranch typically found on soft-bottom habitats and near coral reefs. Owing to severe population declines and high vulnerability to fishing pressure particularly as bycatch in artisanal and small-scale fisheries the

species is listed as Critically Endangered (CR) by the IUCN. Consequently, its protection status necessitates strict conservation action and awareness among coastal communities.

On 4th December 2025, a live female *Rhynchobatus cf. australiae* was incidentally entangled in a traditional hook-and-line gear operated by fishers at the lagoon area of Boduathiri village, Minicoy Island. This marked the first time local fishers had encountered this species, and they were initially unaware of its legal protection status. The fishers promptly shared videos of the specimen with scientists from ICAR-CMFRI, enabling quick identification and verification. The captured individual was a mature female, observed to be in good physical condition with no external injuries, indicating that the entanglement was recent and had not caused prolonged stress or damage. Upon confirming the species protected status, ICAR–CMFRI scientists coordinated with the fishing community to facilitate the immediate and safe release of the animal back into its natural habitat. The active cooperation and responsiveness of the local fishers played a crucial role in ensuring the successful outcome of this conservation action.

These incidents highlight how knowledge regarding protected status of vulnerable sharks is yet to penetrate deeply into the collective awareness of fishing communities across the country. Sustained efforts need to be expended in improving awareness as well as developing rapid channels of communication, so that we can safely release live protected species back into the sea.

Spotlight

Urogymnus polylepis (Bleeker, 1852)

Giant freshwater whipray

The giant freshwater whipray (*Urogymnus polylepis*) was first described as Trygon polylepis Bleeker 1852 from Indonesia. Originally placed in the genus *Trygon*, later taxonomic revisions positioned it within *Urogymnus*. The species name *polylepis* derives from the Greek *poly* ("many") and *lepis* ("scales"), referring to the numerous dermal denticles present mainly on the dorsal surface of juveniles and subadults. The genus name *Urogymnus* comes from the ancient Greek words *oura* ("tail") and *gymnos* ("naked"), alluding to the ray's tail structure that lacks the prominent venomous sting typical of many stingrays. The giant freshwater whipray is characterized by its extremely broad, rounded disc and long, whip-like tail. Its dorsal surface is generally brownish or grey, aiding camouflage in turbid riverine habitats.

This species occupies large tropical freshwater river systems across South and Southeast Asia. It is documented from India to Indonesia, with occasional records from estuarine zones. The 2020 study by Sen *et al*. documented the presence of *U. polylepis* in coastal waters of West Bengal (eastern-India / Bay of Bengal) pointing to its broader distribution along the Indian east coast. Importantly, the species is considered a euryhaline generalist i.e. capable of tolerating a wide range of salinity, from freshwater through brackish to coastal waters. This flexibility likely enables it to use riverine, estuarine, and near-coastal habitats, possibly for different life-history stages. The reports by Sen *et al*. (2020, 2022) fill important gaps in distribution and biology for Indian populations which are crucial for formulating conservation or management plans.

The giant freshwater whipray is among the largest freshwater fishes in the world, capable of reaching up to 240 cm disc width and exceeding 600 kg in body mass. Its immense size, combined with slow growth, late maturity, and low reproductive output typically 2-4 pups per litter makes the species extremely vulnerable. Historically, the species has been impacted by riverine fisheries, where its meat and cartilage were used locally. However, increasing threats from intensive fishing pressure, river damming, sand mining, pollution, and habitat fragmentation have caused severe population declines across its range.

Urogymnus polylepis is currently listed as Endangered on the IUCN Red List, and its conservation is complicated by cryptic habits and the inaccessibility of many riverine habitats. Protection measures include stricter regulation of river, estuarine and coastal fisheries, safeguarding critical habitats, and improving monitoring across major freshwater basins. In India, its protected under schedule 1 of The Wild Life (Protection) Amendment Act, 2022.

Viewpoint

Shoba Joe Kizhakudan, Head, Finfish Fisheries Division, ICAR-CMFRI

The Balancing Act: Sharks and Shark Fishers

While India currently stands as one of the top three shark-fishing nations globally, the rapidly growing thrust on shark conservation worldwide has marked implications in shark fisheries management, and even more so in shark conservation in the country. Deeply rooted in a conflicting triad of competing pressures, namely, ecological vulnerability, livelihood stability and regulatory rigidity, the sustainability of India's shark resources remains precarious, demanding integrated strategies that balance conservation with community needs.

Most sharks grow slowly and have low reproductive rates. As apex predators, overfishing not only threatens the species, it also risks a "top-down" collapse of the marine food web. On the other hand, most shark landings in India being unintentional captures by trawlers and gillnetters targeting other high-value fish, unidirectional focus on conservation alone has adverse impacts on coastal communities particularly in states like Tamil Nadu, Gujarat, and Kerala, where even by-catch is a critical source of income and protein.

The recent amendments namely, The Wildlife (Protection) Amendment Act, 2022 and stringent enforcement directives have had mixed implications within the marine fishing sector. For fishers using non-selective gear like gillnets or trawls, it is nearly impossible to prevent a protected species from entering the net. As a result, they often face heavy fines, vessel seizures, or even arrests for landing protected species or even look-alike species that are often difficult to distinguish.

Beyond immediate financial loss, the fear of legal repercussions for accidental landings is likely to drive some of the trade underground and discourage fishers from sharing critical catch data with scientists, creating a "data blind spot" that will ironically hamper the very conservation efforts the WPA aims to support. ICAR-CMFRI has been championing the intersection of scientifically-backed policy frameworks, shark fisheries management and conservation, and the livelihoods of fishers. Over the last decade, ICAR-CMFRI has evolved into a critical mediator and policy architect for shark fisheries management and conservation in India.

Science-Based Policy Architecture: Beginning with the Guidance on the National Plan of Action (NPOA-Sharks) the Institute has evolved a framework that advocates moving away from "blanket bans" which often fail in multi-species contexts, towards a more layered, multi-faceted approach.

The "Participatory Conservation" Model: Rather than top-down enforcement, ICAR-CMFRI has pioneered stakeholder engagement in translating shark conservation plans into actions that can be easily emulated by coastal communities in all the maritime states and UTs. Through massive awareness campaigns, fishers are now increasingly likely to release protected species caught in nets - what was earlier witnessed in whale shark rescue efforts is now seen to happen in the case of many other protected species, including juvenile guitarfishes. These acts of "Live release" stand testimony to growing awareness among the coastal communities and their willingness to support conservation policies.

Identification Tools: Recognizing the difficulty in distinguishing between many shark species, ICAR-CMFRI has published several field guides, posters and pamphlets to help fishers, traders, and customs and enforcement officials distinguish between legally tradable species and protected ones. These not only support the prevention of illegal trade but also lessens the chances of wrongful penalisation of fishers. ICAR-CMFRI has also been supporting enforcement agencies in the forensic identification of confiscated shark products in trade through molecular genetic tools.

Technological and Genomic Frontiers: Since the early part of this decade, the Institute expanded into genomic research in sharks to identify stock structures. Understanding the genetic health of specific populations, localized "seasonal closures" can be recommended over national bans, to protect sharks during breeding seasons while allowing fishing of unthreatened groups to continue for the rest of the year.

2026 - Challenges and Way Forward: As of early 2026, the supply-driven nature of the market remains a major challenge. Even without high consumer demand, the sheer volume of India's multi-gear, multi-species marine fisheries makes it impossible for sharks to avoid the nets. Thus ICAR-CMFRI's current focus is on -

- Identifying shark hotspots that serve as aggregation grounds for breeding adults or early juveniles, to support spatio-temporal restrictions on fishing activities.
- Value Chain Analysis to understand the journey from net to plate to identify where "social incentives" can be placed to discourage the retention of protected, pregnant and juvenile sharks.
- Increasing the horizontal spread of awareness among coastal communities and the general public on the need for shark conservation without negatively impacting livelihoods that depend on directed or undirected shark fisheries - a strategy that values the predator's role in the ocean as much as the fisher's role in the economy.

Conservation Corner

Conservation awareness programs

Improving awareness among stakeholders is the cornerstone for successful conservation of marine fauna. With this objective, ICAR-CMFRI has been conducting awareness programs along the various coastal states of India. The latest in the series was held at Tharuvaikulam fish landing centre for fishermen and fish traders who are actively involved in the fishing and trade of elasmobranch species. The programme was intended to create awareness about elasmobranch species listed under the Wildlife (Protection) Act, 1972, and those included in CITES Appendices, particularly sharks and batoid fishes. During the programme, informational pamphlets and field identification guides were distributed to the participants to support species-level identification and promote compliance with conservation regulations.

Shark tales- Opinion

Fish landing centres as new shark diversity discovery hotspots for India

Dr. Akhilesh K. V., Senior Scientist, Finfish Fisheries Division, ICAR-CMFRI

Traditionally, the discovery of new, rare or poorly known marine species was often confined to expensive, dedicated expeditions and explorations by experts in diversity surveys, which are logistically complex, expensive and limited in spatial and temporal coverage. However, recent data from Indian fish and chondrichthyan biodiversity research (2010-2025) indicate a significant paradigm shift in how new knowledge on fish and chondrichthyan biodiversity is being generated through monitoring and surveying biodiversity across the Indian coastline. Fishing harbours and fish landing centres across India have emerged as "discovery" hotspots, transforming from mere commercial hubs and food sources into sites of scientific and biodiversity observatories. This shift is largely due to multiple interacting factors, the limited capacity and access of Indian researchers in undertaking dedicated at-sea, onboard expeditions and explorations, expansion of commercial fisheries operating at diverse ecosystems and depths, has resulted in fishing in previously under explored regions including deepsea, seasmounts, in addition devlopment of fishmeal sector and increasing fish prices has directed landing of all catch. As a result, fisheries, catch bycatch landings may and can include rare, potentially new, poorly known or previously misidentified fauna, offering researchers a peek into the hidden biodiversity of Indian marine waters, providing an opportunity for researchers to further investigate and improve scientific knowledge

From a broad perspective, a single fishing harbour/ landing centre with hundreds of fishing vessels operating at multiple depths and fishing grounds landing their catch, can be equated to multiple research expeditions covering diverse habitats and depths, if the corresponding georeferenced, metadata (location, depth, gear type) information is available. Currently fishing vessels are venturing into deeper and offshore waters, are bringing previously unknown, poorly known and rare or misidentified sharks with increased monitoring these can be brought to scientific knowledge. In this way, landing centre monitoring provides easy access to diverse ecosystems, which other wise was difficult to access.

Furthermore, fish markets and landing centres also function as important social and knowledge hubs including ITK's, perception, experience of a large sector. Regular interactions with fisheries stakeholders enables participatory research and contribute to ecological knowledge on depth, seasonality, availability trends, grounds etc. Such collaborations enhance data quality, inclusiveness, trust between scientific communities and stakeholders and enhance biodiversity monitoring programs.

In the last few years, several new fishes and shark species new to science or new to specific regions have been identified or marine faunal diversity knowledge updated from specimens collected or photographs from landing centres. The fish diversity monitoring by ZSI, ICAR-CMFRI, ICAR-NBFGR and Universities has led to interesting discoveries using samples from landings centres as primary research locations have demonstrated the importance of landing site surveys for landed diversity research and provide a unique opportunity to catalogue marine diversity of India.

The increasing adoption of digital tools can further speed up and strengthen role of citizen based diversity documentations. Mobile based documentation platforms (CMFRI- Marlin or iNaturalist) or similar initiatives support photo records and submission databases. When integrated

with national biodiversity repositories these open and citizen supported initiatives can enhance national biodiversity knowledge.

Emerging role of fish landing centres for biodiversity monitoring is increasingly recognised globally as a cost effective and complimenting to dedicated exploration programs. In Indian context where the diversity knowledge is limited, leveraging landing centres as a biodiversity observation platform is a scalable solution where colleges, universities and independent researchers can independently or collaboratively with research institutions updates the baseline information on landed biodiversity, contribution to science. In the era of biodiversity decline such observations, and data base creations can support management and conservation.

Squatina sp. in a fisheries harbour, Cochin (2017), described as a new species *Squatina leae* in 2023

Iago sp. and *Squalus* sp. in a fish landing centre in 2011 and described as new species *Iago gopalakrishnani* in 2025 and *Squalus hima* in 2024.

Share Your Stories

Ajith Shankhumukham

How the Whale Shark Became My Teacher

My name is Ajith Shankhumukham. I was born and raised in Shankhumukham, a coastal village in Thiruvananthapuram. I come from a traditional fisherman family, yet my childhood was strangely distant from the sea. My parents, who had lived the hardships of fishing life, were determined to protect their children from it. They never allowed me to go to sea. As the second son in the family, I was not even permitted to bathe in the ocean.

But the sea never left me. Whenever my parents stepped out, I would run to the shore. Those stolen moments standing barefoot on wet sand, watching waves rise and fall created a bond I could never explain. Even then, something inside me knew the sea was part of my life, whether I was allowed near it or not.

At seventeen, like many young men of my generation, I dreamed of going abroad. I went to Kuwait and worked wherever work was available; furniture shops, daily labour, hotel management. Life moved forward, but something inside me remained restless. Years later, when I returned home, I felt lost. I wandered through my village, watching fishermen prepare their nets, listening to their conversations, observing their silent struggles. Without realizing it, I was learning. The sea, which had been denied to me as a child, was calling me back this time with purpose.

A turning point came when I opened a Facebook account. At first, it was casual—just photographs, small observations. Slowly, it became something more meaningful. I wanted to listen. I wanted to understand. Reaching out to coastal elders and fishermen was not easy. I faced resistance, risks, and moments of deep self-doubt. But I persisted. I began interviewing fishermen and recording their stories; knowledge passed down through generations, never written in books. My first interview was with Gopan, who documented the sea through photography and video. That one conversation opened a door. Over time, I documented nearly a hundred stories, preserving a living history of Kerala's coastline. Then came the moment that changed my life forever.

One day, I witnessed a whale shark entangled in my uncle's fishing net. What disturbed me most was not the animal's struggle, but the indifference around it. No one knew what to do. No one tried. After a long and exhausting effort, the shark was finally freed. I documented the entire incident and shared it online. That single post reached Sethumadhavan from the Wildlife Trust of India (WTI). He contacted me, and soon I was in touch with marine biologist Sajan from WTI. When another whale shark appeared, I helped again. Shortly after, I was invited to participate in a Whale Shark Day programme. From that moment, my path was clear.

Along the Kerala coast, there have been 51 documented whale shark incidents, and I have been directly involved in 36 rescues. Every rescue is different. Every rescue is dangerous. For a long time, there was no proper rescue system. People reported whale sharks or turtles to the police, not realizing these were wildlife emergencies requiring forest department action. I had no formal training. I learned by consulting experts, studying rescue practices across the Indian Ocean region, and most importantly by doing. I rejected unsafe advice and impractical shortcuts. Experience taught me vital lessons: large whale sharks must often be secured by the tail; sufficient water depth is critical for release; tides, waves, and local geography decide success or failure. In places like Thiruvananthapuram, wave dynamics can mean life or death.
Heavy machinery cannot be used on beaches; saltwater

destroys equipment. Every rescue depends on human strength, fishing boats, and the skill of experienced fishermen. What looks like simple manual work is actually deep, applied science.

One of the most dangerous misconceptions I fight is the belief that whale sharks washed ashore are dead. A whale shark can survive up to twelve hours if its body is kept wet. I have taken great personal risks because of this knowledge. When people shout that the shark is dead and demand removal, I check for life; watching tail response, body balance when water flows, and listening for a heartbeat near the front of the body. I have been insulted, mocked, and humiliated. Hours later, the same people clap.

One rescue at Puthenthope will stay with me forever. A whale shark that washed ashore in the morning was still alive by evening. People laughed when I insisted on trying. Against all odds, the shark revived and swam back into the sea. That moment reminded me why I never give up. Through whale sharks, I became human. I began to understand nature. Once, I did not even like pets. Today, I cannot harm any living being.

Many institutions later joined hands with me.ICAR-CMFRI supported the efforts, and I am deeply grateful to Dr. Surya, who taught me many scientific aspects of marine life and helped me understand the biology behind what I was witnessing in the field.

Today, along Kerala's coast, there is only one call, people make when a whale shark appears; my name. Behind my work stands my family: my wife Saji, my daughter Juliana John Ajith, my son Alan Ajith, and my mother. Their support gives me strength. My daughter often helps me research when doubts arise. While many write about whale sharks from textbooks, my knowledge comes from 35–40 real rescues. My greatest happiness is knowing that the whale sharks I rescued are still swimming freely in the Indian Ocean.

I was also the first person to hatch and release sea turtle eggs in Thiruvananthapuram. I travel across Kerala, visiting schools and colleges, sharing traditional knowledge and rescue experiences. If I can make people step into the sea and truly understand it, that is my greatest success.

The international media has written about me, but I introduce myself simply: "I am a fisherman." That identity is my strength. One day, I hope to write a book not copied from the internet, but my own history; where nature and whale sharks survived alongside me.
There were painful moments when I could not be reached, and whale sharks died. After losing my brother, those losses hurt even more. Whale sharks are vital to marine ecosystems, and losing one feels deeply personal. I end this story with a salute to the whale shark; the creature that taught me to love nature.

Whenever a whale shark appears, I feel an unstoppable energy. Until the animal safely returns to the sea, I become what my friends call a "genie." I don't know why. Maybe it is nature's will or God's design

Match the similar ones

A

I

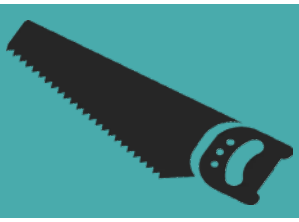
B

II

C

III

D

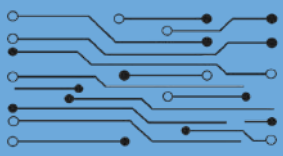


IV

E

V

F



VI

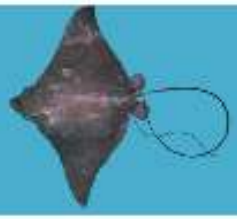
Match the similar ones

G

VII

H

VIII



I

IX

J

X

K

XI

L

XII

Exclude the exception

1.
   (a) Bamboo shark
   (b) Great white shark
   (c) Hammerhead shark
   (d) Bull shark
2.
   (a) Denticle band
   (b) Fins
   (c) Gill rakers
   (d) Liver
3.
   (a) Whale shark
   (b) Thresher shark
   (c) Tiger shark
   (d) Whitetip shark
4.
   (a) Butterfly ray
   (b) Cowtail stingray
   (c) Leopard ray
   (d) Bleeker's whip ray
5.
   (a) Ampulla of Lorenzini
   (b) Swim bladder
   (c) Placoid scale
   (d) Spiracles

Ans: 1. (a-oviparous); 2. (d-undried shark product); 3. (a-planktivore); 4. (a-not a dasyatid); 5. (b-associated with teleost)

Pronunciation

Short O words		Sk blends words	oi & oy words
Ovary	Horn	Scale	Batoid
Occipital	Spot	Scapular	Placoid
Ocean	Bone	Scattered	Rhomboid
Oviparous	Dorsal	Scute	Pointed
Orbital	Hound	Skeleton	Buoyant
Olfactory	Stock	Skate	
Orbiraja	Batoid	Skin	

WORD SEARCH PUZZLE

P	A	R	A	G	A	L	E	U	S	R	A	N	D	A	L	L	I	W	B	C
C	R	U	L	D	S	N	X	O	P	T	A	I	Q	I	U	P	Z	N	R	E
S	P	J	H	O	R	Q	F	P	R	H	I	N	C	O	D	L	M	O	P	N
R	O	C	T	G	M	Z	T	S	I	L	U	Q	I	P	O	A	V	E	V	T
M	D	E	K	E	E	A	Q	B	O	T	K	Y	K	I	N	G	P	K	E	R
V	O	N	I	U	A	M	G	V	N	E	W	U	B	A	T	O	R	L	T	O
H	N	T	C	S	F	W	D	I	A	D	B	N	H	S	Y	O	F	L	M	S
A	T	R	C	P	S	B	F	Z	C	Q	J	R	J	S	P	M	A	P	O	C
Q	A	O	G	H	A	Y	Y	N	E	E	G	E	H	U	U	A	D	M	P	Y
T	S	P	H	Y	R	N	A	Z	G	A	E	N	A	P	S	N	S	I	T	M
O	P	H	Z	R	I	C	T	H	L	X	N	J	W	E	F	E	K	K	E	N
U	I	O	Q	A	N	X	P	J	A	F	X	K	L	R	O	N	I	O	R	U
F	S	R	I	B	I	S	U	R	U	S	P	A	U	C	U	S	Z	B	U	S
C	F	U	V	L	W	I	H	A	C	U	W	D	F	I	G	I	P	S	S	C
Z	E	S	Y	O	E	X	K	M	A	L	Q	J	V	L	C	S	U	Z	P	R
M	R	U	J	C	L	A	N	R	Y	H	P	S	B	I	H	V	X	F	U	E
T	O	Y	L	H	D	G	E	V	R	W	H	Q	R	O	T	N	A	R	S	P
E	X	A	B	I	N	Y	K	C	M	V	J	X	C	S	P	X	Y	T	I	I
E	Z	T	S	I	D	N	A	W	X	L	A	S	I	U	Y	E	N	W	L	D
O	L	O	G	M	G	S	U	N	I	P	L	U	V	S	A	I	P	O	L	A
B	D	E	A	N	I	A	P	R	O	F	U	N	D	O	R	U	M	U	U	T
O	S	J	U	Y	D	H	M	U	S	T	E	L	U	S	M	O	S	I	S	O
G	L	D	O	C	G	A	L	E	O	C	E	R	D	O	C	U	V	I	E	R

Match the Similar Ones

Answer

A - VI	G - XI
B - V	H - IX
C - II	I - XII
D - I	J - VIII
E - IV	K - VII
F - III	L - X

Word Search Puzzle

Answer

Paragaleus randalli	1 Row	Left to Right
Centroscymnus crepidator	21C	Top to Bottom
Odontaspis ferox	2C 4R	Top to Bottom
Centrophorus uyato	3C 4R	Top to Bottom
Sphyrna zygaena	10R 2C	Left to Right
Eusphyra blochii	5C 5R	Top to Bottom
Prionace glauca	2R 10C	Top to Bottom
Isurus paucus	6C 13R	Left to Right
Sphyrna lewini	13C 16R	Left SHAPE NAME BW
Etmopterus pusillus	20C 5R	Top to Bottom
Alopias vulpinus	21C 20R	Right to Left
Rhincodon typus	10C 3R	INVERTED left
Alopias superciliosus	15C 1R	Top to Bottom
Iago omanensis	17C 3R	Top to Bottom
Deania profundorum	21R 2C	Left to Right
Mustelus mosis	22R 8C	Left to Right
Galeocerdo cuvier	23R 6C	Left to Right

Shark Gallery

Elasmobranch Fishery & Diversity in India's Island Ecosystems

Lakshadweep Islands

Andaman Nicobar Islands


















Andaman Nicobar Islands



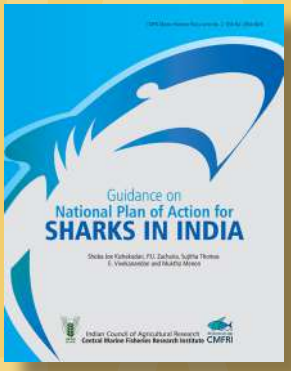


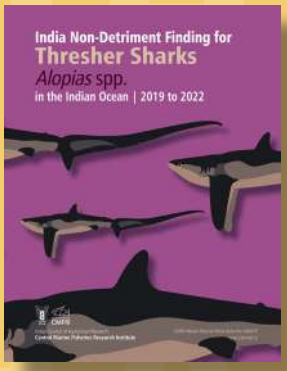


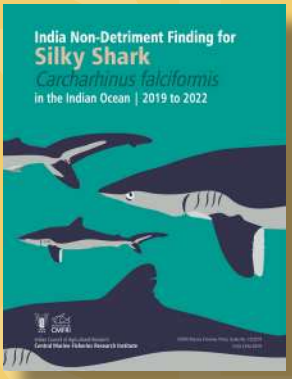


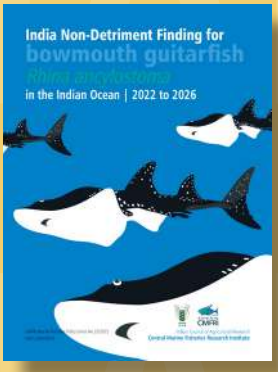
Andaman Nicobar Islands

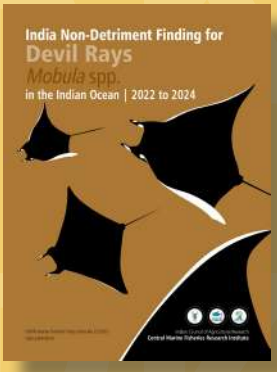
Shark literature





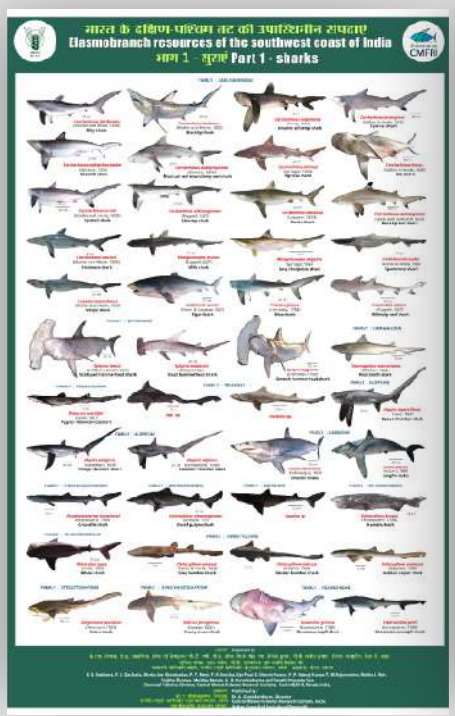






http://eprints.cmfri.org.in

Shark shop


भारत के दक्षिण-पश्चिम तट की उपास्थिमीन संपदाएं
Elasmobranch resources of the southwest coast of India
भाग 1 - सुरमई Part 1 - sharks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The name Kalpamatsya, a combination of the Sanskrit words 'Kalpa' representing the eternal cycle of time and 'Matsya' meaning fish, translates in English as the timeless fish; a fitting name for sharks (sharks, batoids and chimaeras), an enduring group of fish transcending eras, thriving through time and persisting till date. Sharks have existed on Earth for more than 400 million years, pre-dating dinosaurs, and have evolved across mass extinction events to thrive in diverse marine ecosystems. As apex predators with advanced sensory systems and remarkable hunting skills, sharks are keystone species that play an important role in maintaining balance in the aquatic world. This shark digest from India is thus named Kalpamatsya recognizing the timelessness of sharks and also anticipating that the information contained within will ensure that sharks continue to be part of the earths ecological future.