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Indian Bramble Shark (Echinorhinus roinee): Integrative Taxonomy Splits a 3-Meter Deep-Sea Predator Hiding in Plain Sight

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A large, dark-bodied deep-sea shark hauled up for decades in commercial shrimp trawls off India's southwestern coast has been formally recognized as a species new to science: the Indian bramble shark, Echinorhinus roinee . Described by P. Rozario, K. K. Bineesh, and colleagues from the Zoological Survey of India (ZSI) and the ICAR-Central Marine Fisheries Research Institute (CMFRI) in Records of the Zoological Survey of India , the newly named elasmobranch -- capable of reaching nearly 3 meters (10 feet) in length -- had long been misidentified as the Atlantic bramble shark (Echinorhinus brucus).

The recognition of Echinorhinus roinee illustrates how cryptic biodiversity can persist inside well-documented fisheries bycatch, particularly across deep continental-slope ecosystems where limited sampling and superficial morphological similarity obscure evolutionary divergence.

Hiding in Plain Sight Along the Kerala Continental Slope

Bramble sharks belong to the family Echinorhinidae, a morphologically distinctive group of deep-water sharks characterized by stout, cylindrical bodies and scattered, thorn-like dermal denticles. Until now, Indian Ocean specimens were routinely assigned to the Atlantic bramble shark (Echinorhinus brucus).

Off the coast of Kerala in southwestern India, deep-sea crustacean trawlers operating along the upper continental slope at depths between 350 and 450 meters periodically capture large bramble sharks as incidental bycatch. Because their dark brown-to-black coloration and thorny skin superficially resembled Atlantic specimens, regional fisheries records and museum catalogs routinely assigned them to Echinorhinus brucus without dedicated comparative or molecular testing.

| Taxonomic / Ecological Trait | | Echinorhinus roinee (Indian Bramble Shark) | | Comparison to Echinorhinus brucus |

| Order / Family | | Echinorhiniformes: Echinorhinidae | | Same family; represents distinct Indian Ocean lineage |

| Type Region & Depth | | Southwestern coast of India (Kerala), ~350-450 m | | E. brucus originally characterized from Atlantic waters |

| Maximum Size | | Up to ~3 meters (~10 feet) | | Comparable large-bodied continental-slope predator |

| Diagnostic Morphology | | Larger eyes, larger pelvic fins, longer snout-to-gill span | | Proportional cranial and fin differences separate taxa |

| Skin Dentition | | Thorn-like dermal denticles fusing into multi-pointed plates |

| Shared family trait, paired with distinct mitochondrial DNA |

Morphological Diagnostics and Mitochondrial DNA Barcoding

To test whether Indian Ocean bramble sharks truly belonged to the Atlantic species, the ZSI and CMFRI team applied integrative taxonomy -- combining fine-scale morphometric measurements with mitochondrial DNA barcoding. Careful anatomical comparison of landed specimens revealed consistent, diagnostic proportional differences that separate Echinorhinus roinee from Echinorhinus brucus .

Specifically, Echinorhinus roinee exhibits measurably larger eyes -- an adaptation consistent with low-light visual foraging along the mesopelagic and upper-bathyal slope -- alongside proportionally larger pelvic fins and an elongated snout-to-gill region. Like its congeners, its dark brown-to-black epidermis is armored with large, thorn-like dermal denticles that frequently fuse into multi-pointed basal plates. Mitochondrial DNA sequencing independently confirmed deep genetic divergence from Atlantic E. brucus , establishing E. roinee as an evolutionarily distinct Indian Ocean lineage.

Deep-Sea Fisheries Bycatch and Conservation Implications

Separating a widespread, supposedly cosmopolitan deep-sea species into regionally restricted lineages has immediate consequences for marine conservation and fisheries management. Deep-water elasmobranchs -- including bramble sharks, gulper sharks, and deep-sea skates -- typically exhibit slow somatic growth, late sexual maturity, and low reproductive output, making populations highly vulnerable to sustained bottom-trawling pressure.

When a regional endemic such as Echinorhinus roinee is mistakenly lumped under a global species name like E. brucus , stock assessments can mask localized depletion behind apparent global abundance. Recognizing E. roinee as a distinct species restricted to Indian Ocean slope habitats off southwestern India enables fisheries agencies to track catch rates, monitor bycatch mortality in deep-sea shrimp fisheries, and evaluate extinction risk accurately at the regional level.

Cryptic Speciation in the Indian Ocean Bathyal Zone

The discovery also adds to a growing body of evidence that the northern Indian Ocean's continental slopes harbor previously unrecognized chondrichthyan diversity. Steep bathymetric gradients, seasonal oxygen -minimum zones along the Arabian Sea margin, and historical oceanographic barriers promote allopatric isolation among benthic and benthopelagic predators that rarely cross open abyssal plains.

By pairing museum-grade morphometrics with molecular barcoding on specimens recovered directly from commercial landings, the ZSI and CMFRI researchers demonstrated that even 3-meter apex and mesopredatory sharks can remain taxonomically hidden in plain sight -- underscoring the value of routine genetic screening in deep-sea fisheries monitoring.

References & Primary Sources

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