Journal homepage: www.fishtaxa.com

Taxonomic Challenges and Advances in Eel Family Classification: Integrating Multidisciplinary Approaches

Murray Mapes, Emma Mouillot
[1] *School of Biological Sciences, University of Western Australia, Perth, Australia*.

Abstract
Eels have long been a mystery in taxonomy because of their slender, serpentine bodies and intricate life cycles. Multiple factors make eel classification difficult, including eel species' cryptic looks, complex life cycles, few physical characteristics, and sporadic hybridization. Recent scientific developments, characterized by the fusion of interdisciplinary techniques, have started to shed light on this enigmatic family of fish, nevertheless. The taxonomic difficulties and scientific advances in categorizing the eel family are briefly summarized in this summary. The difficulties in classifying cryptic species, the changes that occur at each step of their life cycles, and the limits of morphology-based classification are all brought to light. Eel taxonomy has undergone a radical change due to the integration of genetic analysis, environmental DNA collection, isotopic analysis, acoustic tracking, comparative morphology, and multidisciplinary cooperation. We embarked on this expedition to investigate the transdisciplinary developments in eel categorization. Along the way, we learn about the hidden variety, intricate ecological patterns, and untold tales of these alluring aquatic creatures.

Keywords: Taxonomic Challenges (TC), Eel Family Classification (EFC), Multidisciplinary Approaches (MA)

Citation: Murray, M, Emma, M. 2023. Taxonomic Challenges and Advances in Eel Family Classification: Integrating Multidisciplinary Approaches. FishTaxa 29: 24-35.

Introduction

The eel family is a diverse group belonging to the order Anguilliformes. More than 800 species of eels are known. These are fish but similar to snakes, with an elongated body and absent pelvis fins, but have small pectoral fins and teeth that show cryptic behavior, enigmatic inhabitants of aquatic regions. The classification of eels is complex and has diversity. Eels are classified into two groups by Swedish naturalist Carl Linnaeus, a settler in the field of taxonomy; his work led to the classification of eels. Anguillidae (freshwater eels) and marine eels (Muraenidae), e.g., Green Moray Eel and Zebra Moray Eel. Anguilla is a freshwater eel that can undergo long migrations for reproduction (Ding et al., 2023). These eels are economically and ecologically important, but many threats exist to eel species. Freshwater eels are edible, and these are famous in Asia and Europe.

In China and Japan, both freshwater and marine eels are being eaten. Eels have long captured the attention of naturalists, biologists, and even storytellers since they are those enigmatic, serpentine denizens of aquatic habitats. These organisms have long baffled taxonomists with their streamlined forms and intricate life cycles. Due to their secretive nature, complex life cycles, and lack of physical markers for distinction, eels scattered throughout multiple genera and species have presented substantial hurdles in the taxonomic categorization process.

However, a new age of understanding has been ushered in by recent scientific developments, where multidisciplinary techniques have started to shed light on the mysterious realm of eel family categorization. The mysterious eels, members of the Anguilliformes order, are a varied group of animals found in rivers,

Accepted: 17 December 2022; Published: 25 April 2023

estuaries, and seas worldwide. For good reason, their classification has always perplexed scholars. Their extremely specialized life tactics, which range from the tiny, translucent leptocephalus larvae to the migrating silver eels that set out on long treks and their outward looks, pose obstacles. In this introductory inquiry, we look into the difficult problems that eel taxonomy presents and the fascinating developments that have resulted from the fusion of interdisciplinary methods. These were cost-effective, but now, due to environmental change and rarity, eels have become expensive. Moray (Gymnothorax spp.) eel and conger eel (marine eels) live in saltwater environments and do not undergo long migrations. Marine eels are elongated, ribbon-like bodies; scales are also on the external surface. The first recorded observation of eel was that 'serpentine fishes' define conventional categories to understand these species (Lukman, 2023).

Eel species also have many threats, like habitat degradation, overfishing, and climate change. To conserve these eels, some strategies include managing and sustaining harvesting, understanding the ecosystem, etc. Due to instream barriers, restricting access to juveniles is a major threat to eel fish species. Cryptic species complexes are the central mystery of eel taxonomy. Cryptic species share a similar morphology yet differ genetically. Eels are experts at camouflaging; while belonging to distinct species, they can have startling visual resemblances. Because eels from different species can pass as members of the same species under the pretext of uniformity, classification errors commonly result from relying solely on traditional morphological traits for identification. This tendency is particularly evident in genera like Anguilla, whose cryptic species complexity has baffled researchers for decades. The multi-stage life cycle of the eel adds another level of intricacy. Eels undergo a metamorphic change that takes them from the ethereal, translucent, ribbon-like leptocephalus larvae to the glass eels that enter freshwater environments and finally to the strong yellow and silver eels. It is challenging to link these stages of an individual eel's life to a single species since each stage represents a separate biological and ecological challenge. These phases were frequently handled separately by traditional taxonomy, thus concealing the real diversity within eel families.

Eels fall in the kingdom Animalia-multicellular, heterotrophic species belongs to phylum Chordata due to the presence of the notochord, subphylum Vertebrata, class-Acinopterygii and Sarcopterygii, further classified into class and families, genus- Anguilla, European eel- Anguilla Anguilla, American eel- Anguilla rostrata, Japanese eel -Anguilla japonica. Eel's life cycle involves stages: First, Leptocephalus Larvae – transparent, small, flat move in oceans. The larval stage in tropical eels is 4-6 months but in temperate regions, the larval stage is longer than in tropical (Nims, 2023). The second stage is Metamorphosis-transformation in the body in structure, shape, color, elongation, and fins. They also migrate during the developmental stages. Eels live in freshwater bodies where their body grow and mature. During the reproduction stage, they develop sexual organs and change color. They spawn in deep seas regions; eels die after spawning (Kandimalla et al., 2021). Eels are carnivorous and usually feed on organisms present in aquatic systems, like small fishes and worms. They have great importance economically due to high demand and need.

Biologists faced taxonomic complexities in classifying eels because of many missing points. Taxonomic challenges have been increased, determined by the integration of multidisciplinary approaches (Kandimalla et al., 2022). Due to their diversity, peculiar behavior, and historical taxonomic difficulties, eel species have numerous challenges, including variation in morphology, making eel fish species distinguish between closely related eels, complex life cycle- larvae and adults have different appearances, making further complications, cryptic behavior appearances but genetically they are different. Researchers do DNA analysis to distinguish between different species.

Hybridization led to the formation of intermediates that become quite challenging in the eel fish classification, absence of diagnostic features, errors in historic classification; eels live in a deep environment, making it difficult to observe adequate samples (limited specimens), geographic variation in morphology and

genetics, convergent evolution, rare species, hybrid swarms where different species interbreed, dealing with the ancient lineages evolutionary relationships can be challenging, difficulty in achieving taxonomic consistency, misidentification in historical collection, lack of history knowledge (Weston et al., 2022). Eels provide taxonomists with a restricted set of morphological criteria, unlike several groups of creatures with distinguishing characteristics that facilitate categorization. Their shortened fins and elongated, ribbon-like body provide few distinguishing features.

A misinterpretation or underestimating of eel diversity may result from the considerable overlap between species in the few distinguishable features, such as changes in coloring or fin-ray counts. In addition to the eel taxonomy's intrinsic complexity, the phenomena of hybridization further complicate matters. Eels are known to interbreed, creating hybrid offspring, particularly those with overlapping geographic ranges. These hybrids can be difficult to classify within established species boundaries because they frequently exhibit intermediate physical features. Eel taxonomy has seen a fundamental change in recent decades, spurred forward by the fusion of diverse techniques. Researchers have been able to solve the mystery surrounding the categorization of eels because of advancements in scientific technique.

Overcoming these challenges requires the integration of multidisciplinary approaches like studies of ecology, genetics, and morphology for a better understanding of eel fish species taxonomy. Numerous eel species face conservation challenges due to climate change, Water quality, and overfishing. Eel taxonomy still needs to be solved, leading to inconsistencies and difficulties in classification approaches. Misclassification of species leads to wrong decisions about conservation strategies (Nathan et al., 2022). Researchers collect data from multiple sources, discuss with experts in this field, analyze data to overcome these challenges and find accurate methods and techniques of classification.

Various advanced techniques are used to overcome numerous challenges in the classification methods. As the biology field advanced, totally relying on species morphology for the classification was insufficient, so multidisciplinary approaches began to gain popularity for eel classification. Integrating multidisciplinary approaches in eel species classification involves combining methods and techniques to understand the taxonomy. Scientists interact with each other and discuss various concepts to know more about taxonomy (Rather et al., 2023). DNA barcoding- researchers analyze eel's DNA from a particular region to distinguish species. This technique has transformed eel fish classification between species. To reconstruct the evolutionary tree of eel, genetic data is used i.e. Molecular phylogenetics; this study helps to understand the eel's history to classify eel species.

Researchers analyze and quantify the features of eel fish to classify species. This technique is known as morphometric. DNA sequence technology to study taxonomy (Next generation sequencing) efficient and cost-effective provides valuable data. Molecular and advanced genetic techniques allow biologists to look closely into the DNA, revealing hidden diversity and elucidating evolution and its relation (Yin et al., 2020). advanced technique to analyze the eel species in aquatic environments is the use of eDNA. Scientists use eDNA (environmental DNA) shed by eel in water bodies to identify the species in different aquatic regions metagenomics analysis).

To identify and classify eel species, gut microbiome analysis plays a significant role (Charsley et al., 2023). Analyzing the stable isotopes helps in classifying the eels; studying the eel's behavior aids in identification. Collaborations among ecologists, geneticists, ichthyologists, and other experts can easily solve the challenges in species classification and provide more efficient and accurate taxonomic data about classifications. Apart from techniques, environmental factors also impact the population to be classified and distributed. These advances and techniques are vital in improving the ability to identify and classify the eel

species. In addition, environmental conditions play a crucial role in shaping the eel population's distribution across various habitats. These factors encompass temperature, water quality, and habitat availability, all of which contribute significantly to the eels' ecological niche. Consequently, understanding and monitoring these environmental influences is essential for a comprehensive analysis of eel species diversity and their sustainable management.

Literature review:

Researchers claim that the fossil records of spiny eel were first determined in the Nile River in Egypt. Various molecular methods were employed to study the fossil records of eels. The morphometric features of the spiny eel record exposed from the Nile River were matched with the present-day records of eel to explain its geographical distribution over time (Timi & Buchmann, 2023).studies claim that researchers have explained the behavior of various animal species concerning their changing environment. Researchers studying the species explained all the information about the morphological features possessed by various fish species. These researchers provided information about the early history related to fish species and changes in fish species' morphological features with time (Charsley, Sibanda, Hoyle, Crow, & Sciences, 2022). The taxonomy of eels has changed dramatically with the development of molecular biology. Phylogenetic analysis and DNA barcoding have become essential for identifying cryptic species within eel genera. The complex network of eel variation hidden by their outward similarity may now be revealed by scientists by closely examining the genetic markers particular to each species. In addition to identifying previously unknown species, genetic research has also shed light on their evolutionary links and biogeographical patterns. Environmental DNA, or eDNA, is a novel method for classifying eels. Researchers can identify eel species, even in their secretive larval stages, by retrieving and analyzing the DNA shed by eels in their watery habitats. By avoiding the difficulties of direct observation, this technique enables the monitoring of eel populations in habitats where conventional surveys frequently fall short. Understanding eels' distribution, dispersion, and recruitment across various environments has become easier due to eDNA study. studies reveal that various factors have resulted in the alternation of microbial diversity. these factors include industrialization as well as overpopulation. Both these factor disturbs the patterns of various genera and pollutes the environment. Several biological methodologies and approaches are used to save microorganisms of various genera and movement from pollution. also, using microorganism-based biological methods to remove pollutants holds immense significance.by producing metabolites, the eco-friendly microorganism helps minimize pollution by producing metabolites (Weldon et al., 2020).studies suggest that fish movements in aquatic environments determine their behavioral ecology. The survival of fish in aquatic ecosystems depends upon their movement. The movement of fish species depends upon their biological features. various environmental factors play a critical role in a

species' movement from one aquatic ecosystem to another for its survival(Yajima et al., 2023).studies suggest that biodiversity is explained through the phenomenon of DNA metabarcoding. The samples for assessing the biodiversity are mostly taken from aquatic environments. The DNA extraction is made from the sample, and then the extracted DNA is amplified using the PCR technique. the PCR provides information about the fish specie whose DNA was extracted and then determine the biodiversity associated with the specie(Lett, Malauene, Hoareau, Kaplan, & Porri, 2023). The study of stable isotopes has become an effective method for understanding eels' intricate ecological and migratory patterns. Scientists may learn important details about eels' food, habitat utilization, and geographic origin by analyzing the isotopic composition of their tissues. As distinctive fingerprints, isotope signatures reveal the tactics used by various eel species. This method has been particularly useful in revealing the secrets of eel migrations, offering insights into their amazing travels across enormous oceanic reaches. Scientists have been able to listen in on the private lives of eels due to the fusion of telemetry and acoustic tracking technology. Individual eels can be fitted with transmitters to allow researchers to track their migratory patterns in the wild. This real-time data has provided unprecedented insights into the behavior, habitat preferences, and population dynamics of eel species. A phenomenon formerly veiled in mystery; the extraordinary transoceanic journeys made by silver eels have been made clear due to acoustic tracking. Studies predict that Anguillids are among the fish species with high commercial importance. The process of river fragmentation is a threat to the population of Anguillids species. for studying the morphological studies related to Anguillids species, the use of the neural network method is adopted. Studies explain that bony fishes are among the most popular backboned fish in the aquatic ecosystem. Various fossils recorded based on bony fish explain its evolution series. bony fishes have undergone macroevolutionary changes over time(Zang et al., 2021).studies explain that the freshwater ecosystem of malaise is affected due to the influence of high precipitation levels. Various conservation strategies are employed(White et al., 2020).studies highlight that for proper information about any topic, it is important to have full knowledge about the topic. using computational thinking in educational programs helps students learn more about their related topic through computer-based technology. this computational thinking approach develops knowledge-gaining behavior in students(FURTADO & LEE, 2022).studies explain that conservation translocation is the strategy used for conserving the threatened species present in freshwater ecosystems. moreover, feasibility assessment tools are used along with conservational strategies to save the freshwater fish population from becoming extinct(Elmer et al., 2021).studies suggest that a new species, *Macrocephenchelys*, related to the eel genus, is seen in the Arabian Sea. The new species is characterized by having different features that resemble the eel but have unique features different from(Aly, Ismail, & Ali, 2023). Also, the eel from the genus *Notacanthus* is present in the Arabian Sea.it is a relatively new species that came into existence because of the revolution eel species has undergone with time. The record of the existence of this species of eel is observed in the west of the Indian Ocean(Copeland, Stockwell, & Piovano, 2023). Studies reveal that there is a connectivity between organisms in the aquatic environment. This connectivity helps the aquatic species move from one main ecosystem to another for survival. several marine protected areas are developed in the coastal areas to protect marine species. These protected areas protect marine species from various barriers. While genetic research and advanced techniques have revolutionized eel taxonomy, conventional comparative morphology is still a useful supplementary strategy. When paired with genetic data and data from other interdisciplinary methodologies, morphological traits provide a more comprehensive picture of eel categorization. Integration of morphology contributes to validating species boundaries, particularly where there is potential for minor genetic diversity. Promoting multidisciplinary collaboration may be one of the most important developments in eel taxonomy. To understand the complexity of eel categorization, experts from several domains, including genetics, ecology, morphology, and oceanography, have teamed up. studies

explain that population growth impacts the life of marine species. these impacts have become prominent in the 20th century. The impact on marine ecosystems due to anthropogenic activities has been observed for many years. Studies predict that to save polluted aquatic environments from extreme demand, various environmental microbiomes are introduced in marine ecosystems. Microbiomes help in the remediation process by saving the environment from contamination. the use of metagenomic methodologies helps in understanding the role of microbial organisms in ecosystem contaminated due to human activities(UIBLEIN & NIELSEN, 2023).studies explain that it is very important to know about the life history related to fish species to conserve the fish population. geochemistry is the subject that provides all the information related to the history associated with various fish species. studies predict that cusk reel is found in the Salmon Sea. Other five species associated with the genus Neobythites are observed along with cusk eel in the oceans of western states. All these five new species have similar characteristics, with eels having different developmental stages.

Studies made through the larval dispersal model suggest that 11 fish taxa are observed in the Gulf of Mexico. This model provides information about the behavioral characteristics shown by these eleven species. The larval dispersal model determines the sampling data about these 11 species(Vasbinder, Ainsworth, Liu, & Weisberg, 2023).studies reveal that endemic biodiversity is observed in the species found in the deepest seas. hadal zones in the deepest sea are where rearrest and unique species are found. Because of the deepness, the species in the hadal zone face the gene flow barrier. The phylogeographic patterns of deep-sea species are observed in amphipod species. studies suggest that e-commerce is a platform where various fish species are sold for food purposes. The fish species present in freshwater have an evolutionary history that makes them unique. This uniqueness makes these species commercially important(Ando et al., 2021).

Challenges with eel taxonomy:

1. Eels are renowned for their cryptic species complexes, in which individuals with identical appearances may belong to distinct species. Traditional taxonomy, which frequently places a strong emphasis on physical characteristics, needs to be revised to recognize these cryptic species.

2. Eels have complicated life cycles with several unique phases (leptocephalus larvae, glass eels, yellow eels, silver eels, etc.), which frequently differ greatly from one another in appearance. Historically, different life phases of the same species have been mislabeled as distinct species.

3. Few Classifiable Morphological Features: Eels have few classifiable morphological features, which vary widely and within species.

4. Hybridization: Cross-pollination of closely related species might make it more difficult to classify them.

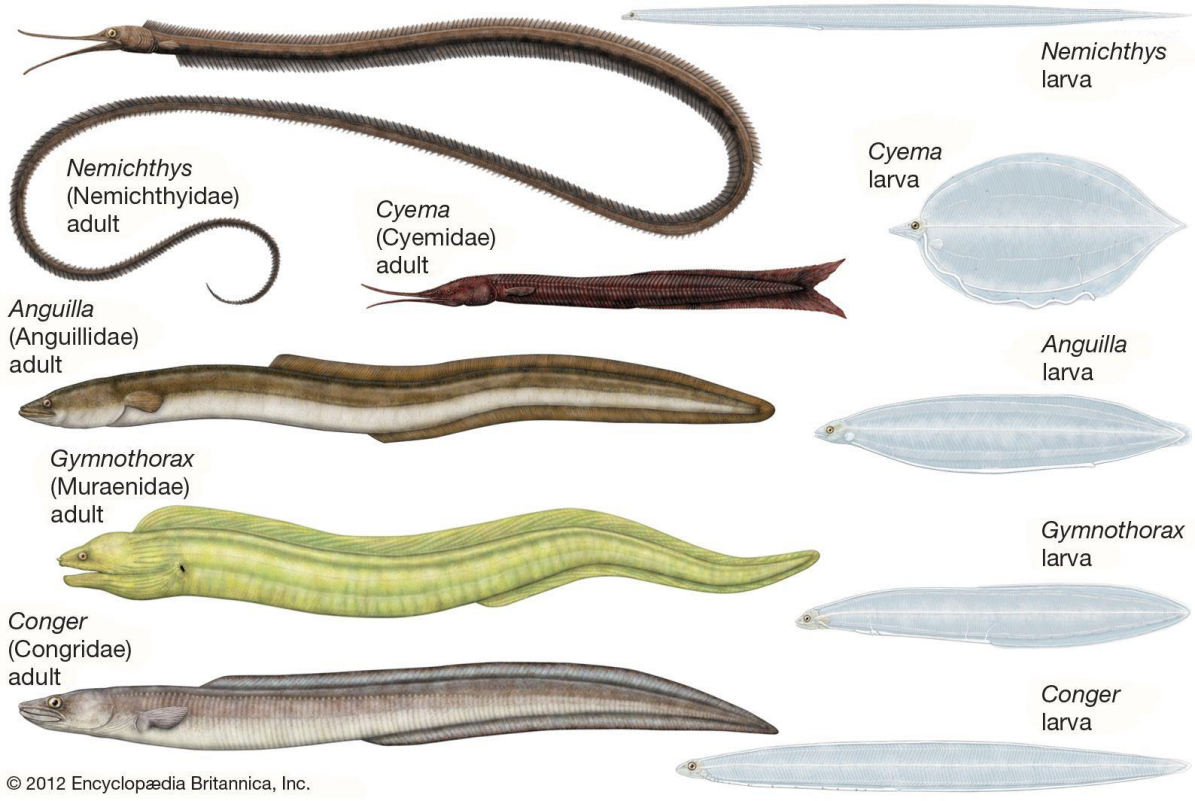
Applications:

The classification of the eel family has taxonomic challenges and various advanced techniques to overcome these challenges in the eel fish classification. Here are some applications of eel family classification in fisheries management.

Fisheries management:

Fisheries management plays a vital role in the continual usage of the eel family. Accurate classification of eel families and population is key to successful fisheries management. The categorizing of eel families is important for accurate identification of different species of eels. The eel family targets particular species or different life stages, for example, young eel for aquaculture. Precise identification is essential for examining the status of different eel species. Eels undergo migration between different habitats, fresh and marine

environments during reproduction(Fois, Cuena-Lombraña, & Bacchetta, 2021). They were categorizing aids to detect the distribution and number of life stages, i.e., larvae and adults. Understanding these concepts also helps in conservative efforts. Classification facilitates the foundation for regulating the fisheries process, as effective fisheries depend upon setting catch limits, protecting species, and reducing overfishing. European eel (Anguilla Anguilla) is alarmingly endangered. For the protection of these endangered species, strict measures are implemented to regulate fisheries and bans on fishing. The help of accurate classification could do this, and recovery processes should be done to protect the endangered species (Kalogianni et al., 2023). The accidental catch of non-desired species is a worry in eel fisheries. Classification of eel family species helps reduce the capture of non-target fish species. Also, categorization makes it feasible to identify various eel fish species. Eel classification helps in the identification of different habitats. Conservation measures are followed to protect these habitats from harmful effects or human activities that can damage fish habitats. The eel family is provided by fish ladders or bypasses, allowing them to migrate through these structures for reproduction; this could be done by the eel fish classification, which helps to design these eel-friendly structures. Categorization helps in restocking efforts if eel fish species are declining somewhere. Genetic diversity is essential for restocking species genetically suited to the local environment (Bouvier et al., 2023).



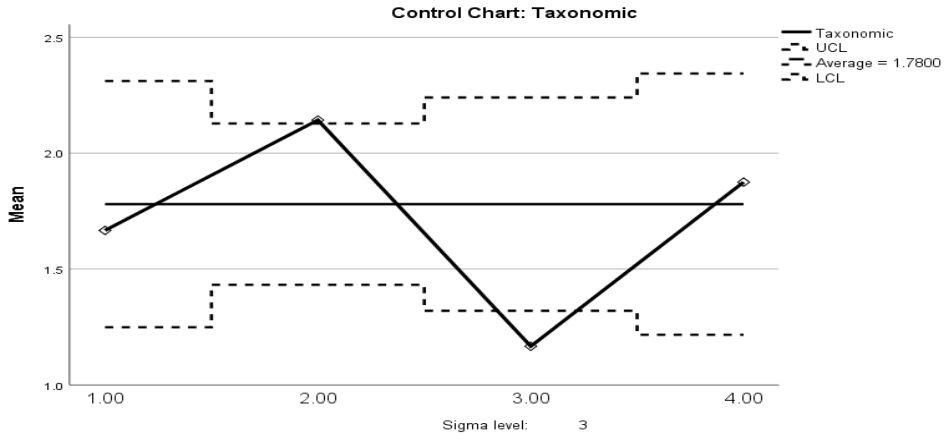
Economic importance:

Eel aquaculture is an important industry in many countries, and accurate classification is essential (aquaculture development). Eel farming has increased in recent years due to high demand, and eel aquaculture is economically important. Classification helps in exportation and trading. Eels are exported to many countries, and to international markets, ultimately fishers generate profit (Cooke et al., 2022; Zhang et al., 2023). The eels' categorization helps international trade regulations and contributes to economic benefits as eels have been a valuable seafood resource in numerous countries. People like eel fish meat, which is also used in Chinese Japanese restaurants for making several cuisines (Kodeeswaran, Smith, Ajith Kumar, & Sarkar, 2023;

Konhamkakkada, Kinattumkara, Raghavan, & Sivanpillai, 2023). So, proper classification is essential in commercial fishing. Eel fishing provides a livelihood for many individuals and supports many communities. Communities depend upon eel fish species for their economic well-being. Precise categorization is important for breeding programs, as different species have different reproductive behaviors, increasing eel fish farming efficiency (Jonasen & Gram-Hansen, 2019). Disease management plays a significant role in the economy. Suppose the eel species is susceptible to disease. In that case, such measures should be taken to overcome the disease, and classification allows for developing particular disease management strategies that also help reduce economic losses (Saccò et al., 2019).

Environmental monitoring:

In eel fish classification, environmental monitoring is an important component, facilitating informative data to observe the ecological text and attributes that affect the distribution and behavior of the eel family. Assessing the quality and traits of eel habitats lies in environmental monitoring. If we talk about water quality, pH and concentration of nutrients are measured in determining the water quality. Water quality matters to eel families and is sensitive to variations in water quality; changes can affect species behavior. For example, some eel species live in moderate oxygenated levels, some in well-oxygenated waters, and some are tolerant to any oxygenated level (Chandran, Meena, & Sharma, 2020; Cotter, Staines, & Fisheries, 2023). Another parameter, i.e., temperature, is crucial in eel fish behavior and morphology. They were monitoring water temperature aids in the identification of eels. Eels spend their lives in freshwater but spawn in oceans, examining salinity levels aiding eel fish species classification (Friedman, 2022; Mohammed et al., 2021). Substrate type also impacts the classification of the eel family classification. Sand, mud, and rocks can affect eel habitats and species feeding and burrowing behavior. Eels are related to flowing waters and hydrodynamics, affecting eel behavior and migration. Examining the water flow helps in the identification and classification of eels. Examining the water quality for contaminants is necessary to observe the health of the eel population. These eels are sensitive to pollutants. Various methodologies to collect data for monitoring the species include acoustic telemetry-attaching transmitters to eels and using receivers to detect their movement. This technique provides accurate information about species migration, movement, and behavior (Mukherjee, D'Ugo, Giuseppetti, Magurano, & Cotter, 2023; Ruppert, Kline, & Rahman, 2019).



Classification Advances related to the Eel family:

1. Genetic research: Molecular methods have completely transformed Eel taxonomy, notably DNA barcoding and phylogenetic research. Even when two species appear to be the same or part of cryptic complexes, researchers may utilize genetic markers to distinguish between them.

2. Environmental DNA (eDNA): analysis of water samples has made it possible to identify eel species in their larval stages, which can be challenging to see in person. Tracking eel species' dispersion and spread using this approach is very helpful.

3. Analysis of stable isotopes: This method can shed light on eels' ecology and migratory habits. Researchers can determine an eel's food, habitat utilization, and geographic origin by looking at the isotopic composition of its tissues.

4. Acoustic monitoring: Technological developments in telemetry and acoustic tracking have enabled scientists to track eels' movements and migrations in the wild. Understanding their behavior and population dynamics is made easier by this knowledge.

5. Comparative Morphology: While morphological characteristics alone might not be adequate to identify a species, integrating morphological data with genetic data and other methodologies can provide an eel taxonomy with a more complete picture.

6. Interdisciplinary cooperation: It has been essential in creating a comprehensive knowledge of eel variety and taxonomy. This cooperation has been between specialists in genetics, ecology, morphology, and other domains. The validation and improvement of species classifications are aided by the integration of data from other fields.

Eel trapping:

Eel trapping is a significant strategy for categorization and study. Eel trapping is when researchers use many tools and techniques to trap eels in their natural habitat. Fyke nets are being used to capture eels. These are funnel-shaped traps set in waterbodies and are equipped with chambers to trap them in a net strongly. Eel pots are likely to be sent to waterbodies along with food to attract eel species. Usually set in freshwater and marine habitats, cylindrical. Trapping weirs, trawling nets, and electric fishing methodologies are also used to attract eels for identification and classification. Eel trapping provides valuable morphological data, samples collected by species used for genetic analysis. To study age and growth and population assessment.

Medicine:

Eels produce slime for the defense mechanism, and secretions help in medicinal applications. By using eel slime, wounds can be healed. Antimicrobial properties are used to treat infections, especially for antibiotic-resistant bacteria. Slime also contains anti-inflammatory agents to treat skin disorders. Eel slime could be utilized in drug delivery systems, tissue engineering, and ophthalmology to create artificial tears or treat dry eye syndrome. Compounds present in eel slime are also helpful for dental care used in toothpaste or mouthwashes.

Conclusion

Eels' taxonomy, formerly obscured by cryptic species and complicated life cycles, is now entering a new understanding period. The taxonomic landscape of eels has been clarified by integrating multiple methodologies, including genetic analysis, environmental DNA collection, stable isotope measurement, acoustic tracking, comparative morphology, and interdisciplinary collaboration. In conclusion, scientists have faced a number of difficulties in the taxonomy of eels throughout the years. The history of eel taxonomy is a tribute to the effectiveness of interdisciplinary scientific research, inventiveness, and the unrelenting quest for knowledge. Eels continue to amaze and inspire, reminding us that there is still much to learn about the hidden beauties of the natural world, even if many of their riddles have been solved. These research studies have improved our understanding of the ecological, evolutionary, and behavioral complexity that underlies the existence of these unique species as well as long-standing taxonomic mysteries. By using this multidisciplinary approach, we will be able to unveil the mysteries of eel taxonomy and expose the hidden variety and untold tales of these fascinating aquatic creatures.

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