Diver comes face-to-face with a giant moray in a shipwreck at Mabul, Malaysia.

Misunderstood & Maligned Morays

Text and photos by Nigel Marsh

Aside from sharks, moray eels are one of the most maligned and misunderstood of all marine animals. Thought by most people to be highly dangerous because of their depiction in films and books, morays are not malicious monsters, but an important predator of any healthy marine ecosystem. And as most divers will attest, morays are generally shy and docile if not harassed. Nigel Marsh shares insights about these intriguing animals.

I met my first moray as a thirteen-year-old and it was an encounter I will never forget. At the time, in the 1970s, the moray was considered to be a very dangerous animal, reported to attack divers and fishers. I had read stories of Roman slaves being fed to hungry morays for entertainment and had recently seen the film *The Deep*, which included a scene where an enormous moray attacks and kills a diver. So, when I encountered a 2m-long giant moray while snorkelling on the Great Barrier Reef, I was understandably terrified!

The incident occurred as I was happily snorkelling the reef edge, but my feeling of joy turned to terror the instant I stuck my head into a cave and came face-to-face with an enormous giant moray!

I almost swallowed my snorkel, and quickly backed out of the cave and shot to the surface before I was savaged by this vicious denizen of the deep. Catching my breath on the surface, I kept an anxious eye below, fearful that the eel would emerge from its lair and attack me at any second.

But after several minutes, there was no sign of the moray.

Building up my courage, I dived again to get a better look at this so-called "monster". I slowly approached the cave and stopped several metres away from the large eel.

Not all morays have sharp teeth, as some, like this snowflake moray, have short stumpy teeth designed to crush the shells of prey (right).

Morays, like this impressive mosaic moray, are renowned for their sharp fang-like teeth, but morays also have a second hidden jaw located in their throat to assist in swallowing prey (right).

This huge moray, with a body as thick as my thigh, did not seem to be interested in me at all. I closely studied the eel, looking for signs of aggression, worried that it might suddenly lunge forward and attack. But it seemed to be content simply resting in its cave looking at passing fish, not even snapping at them. It did look very fierce and threatening the way it constantly opened and closed its mouth, revealing rows of razor-sharp teeth, but apart from that, it seemed to be quite unassuming, not the monster I had been brainwashed into believing was a threat to divers.

I dived down several more times to study this large eel, and each time I got closer and closer, and the moray continued to ignore me. It was only at this point that I realised the moray was not alone, as an even bigger giant moray was lurking at the other end of the cave. Seeing this second larger moray was a huge shock, especially when I realised, I had had my back to this moray the entire time. It could have attacked me several times, but it did not, as it seemed to be completely indifferent to me.

I suddenly realised that all I had seen, read and heard about these animals was completely untrue. Returning to this cave the next day, I was disappointed to find it empty, the morays having moved to another lair.

That experience taught me that morays are not dangerous, aggressive animals as presented in the media at the time, and it also started my fascination with these incredible reef residents.

Morays constantly have to open and close their mouths to breath, as illustrated by this fimbriated moray.

Biology and behaviour

Morays are placed in the family Muraenidae and 211 species are currently recognised. Like all eels, they have an elongated body, and most are nocturnal hunters, hiding away in a lair by day. The great majority of morays live in tropical and subtropical waters, especially on shallow coral reefs. However, a few species inhabit cooler temperate waters, others deep water, some venture into brackish waters and a few are even found in freshwater.

Morays are easily distinguished from their cousins, the conger eels, as they have a larger head and deeper body, but smaller eyes. However, some small morays do look similar to conger eels. The easiest way to tell the two families apart is to look for pectoral fins behind the head, congers have them and morays do not. Morays also typically have much more prominent teeth, with most species having long dagger-like fangs. These teeth vary in size and arrangement depending on the species and what they eat, but a few have short blunt teeth that are designed to crush the shells of crustaceans and molluscs.

Jaws and teeth. Morays use their sharp teeth to catch and restrain prey, or in the case of the stumpy teeth morays, crush and detain. Some even have an extra row of teeth on the roof of their mouth to restrain prey. Morays do not chew their food, so it has to be swallowed whole. To assist in this process, morays have a second unique set of teeth located in the back of their throat called the pharyngeal jaw. Some fish also possess pharyngeal jaws, but they remain static and are used to further process

Most morays reside in tropical or sub-tropical waters, but the green or yellow moray lives in the temperate waters of Australia and New Zealand (left); Morays often share their lairs with cleaner shrimps, like this honeycomb moray and a white-banded cleaner shrimp (below); Some morays are solitary creatures, but others, like these white-eyed morays, are happy to share a home (right); Morays make homes in caves, cracks and crevices in natural and artificial reefs, but this small sieve-patterned moray has selected a sea squirt as its lair (bottom right).

food while it is swallowed. In morays, the pharyngeal jaw can extend forward to grab prey and smoothly transport it into the stomach. It is thought the movable pharyngeal jaw has evolved in morays as they do not suck in prey like fish, as residing in tight crevices leaves little room for them to open their mouth wide enough to create a suction action.

Diet. Morays eat a variety of prey, most of which are captured at night. Some species are very active hunters, searching the reef and even rock pools for prey, some even exit the water to grab shore crabs. While other morays are ambush predators, only seizing prey that venture close to their lair. Morays consume fish, octopus, cuttlefish, squid and some even have a preference for crabs, shrimps and even seashells. When tackling large prey, or prey wedged in a crevice, morays have been observed tying their body into a knot to exert more force, and also knotting themselves around large prey to rip it apart or compress it for easier swallowing.

Hunting behavior. Encountering a hunting moray on a night dive is an unforgettable experience. On one memorable night dive on the Great Barrier Reef, I watched a giant moray (*Gymnothorax javanicus*) stalking the reef, hunting for sleeping fish. When a fish was discovered, the moray would instantly snap at the dozing fish. Some fish woke just in time and shot away to safety, but the moray managed to grab several small fish, including one fusilier that it bit in half!

Most morays have very prominent tube-like nostrils at the end of their snout to detect the scent of prey. This is their most important sense for hunting quarry, as many morays are considered to have poor eyesight. However, hunting at night, good eyesight is not essential. But this statement is not true for all morays, as some feed by day, grabbing prey that swims by their home or even hunting crabs on shore. In these instances, good eyesight is required to successfully capture prey.

Predators of morays. A number of animals feed on morays, including groupers, sea snakes and barracuda. And some morays are known to be cannibalistic, feeding on other morays. Several shark species also prey on moray eels. On one notable dive off Tweed Heads, Australia, I encountered a spotted wobbegong shark (*Orectolobus maculatus*) with a tail of a stout moray (*Gymnothorax eurostus*) hanging out of its mouth!

Toxicity. Humans should avoid eating morays as their skin and flesh are toxic, but some cultures do consume them. Morays, unlike most of their fish cousins, lack scales and instead have smooth skin that is covered in a toxic mucus. Their flesh, especially the liver, also contains high levels of ciguatoxins, which can result in ciguatera poisoning if consumed. A number of deaths have been recorded from people eating moray flesh.

The secreted mucus that coats the body of morays protects the skin, making it easier to slide through the water, over the reef and in and out

of holes when looking for prey. The mucus also assists a number of sand-burrowing morays, like the ribbon eel (*Rhinomuraena quaesita*), to slide through the sand and keep their burrow walls from collapsing.

A number of morays can change sex, but only the ribbon eel changes colour as well. This ribbon eel is in the process of change from its black juvenile phase to its blue male colouration (right); Many morays have decorative skin patterns that assist with camouflage, like this whitelip moray (bottom left); The whitemouth moray is appropriately named as its does have a white mouth, while other morays have patterned mouths (bottom right).

Skin patterns, gills and size. Some morays have very plain and even drab skin patterns, but most have decorative skin patterns of spots, bands, reticulations and marbling. These skin patterns have evolved to aid in camouflage. In some species, these patterns also decorate the inside of the mouth, and a few also have brightly coloured mouths, most notably the yellowmouth moray (*Gymnothorax nudivomer*) and whitemouth moray (*Gymnothorax meleagris*).

The gills of morays are quite small, simply a round opening located behind the head. To assist in pumping water through these small gills, morays constantly open and close their mouth. When first encountered, this behaviour does look very threatening, especially with the mouth gaping and revealing rows of very sharp teeth, but this is simply the way morays breathe.

Morays vary greatly in size. Most are around 1m long, but the smallest, the Synder's moray (*Anarchias leucurus*), reaches a length of only 12cm, while the longtail moray (*Strophidon sathete*) can grow to 4m in length. It is thought that morays live between 10 and 30 years.

Reproduction. The sex lives and breeding habits of morays are poorly understood. Most morays are solitary, only coming together to breed. There is no known breeding season, but an abundance of food and warmer water temperatures over summer are thought to be triggers that lead to more successful mating. Courting morays have been documented opening their mouths wide in an elaborate courtship display and wrapping their bodies around each other. The female then lays her eggs, and the male fertilises them with his sperm. Some lay their eggs in a secure hiding place in the reef, while others release them straight into the water column.

Life cycle. The young take between 30 to 45 days to hatch, then they drift with the plankton in a ribbon-like larval stage, known as a leptocephalus. Depending on the species, they remain in this larval form for months and even years. Moray larvae have no digestive tract, and with a body wall only one cell thick, they cannot digest plankton and instead eat the discarded exoskeleton of plankton and plankton faeces. As they start to develop into their adult form, they find a reef to call home. It takes around three years for most morays to become sexually mature.

The life cycle of some morays is not that simple, as some species can change their sex from female to male or vice versa, most notably the ribbon eel. This strange moray not only changes its sex, but also changes colour, with the juveniles being black, the females yellow and the males blue. How long this process takes is unknown, but morays transitioning their sex are sometimes observed with a mix of yellow and blue colours.

We know sadly little about the lifestyles of most morays. Some have a limited home range and a preferred lair, while others roam the reef and use a variety of hideouts. Most live solitary lives, but others are happy to share a lair with other morays of the same and other species. Some morays have also been documented hunting co-oper-

Dead barred moray, a victim of fishing activities

atively with other fish, mostly groupers, with the two species working together to corner and flush out prey.

Intelligence and interaction. Morays are considered to be more intelligent than the average fish. This is especially evident to divers that have struck up a relationship with a moray through feeding them, with the moray recognising and sometimes interacting with only one diver.

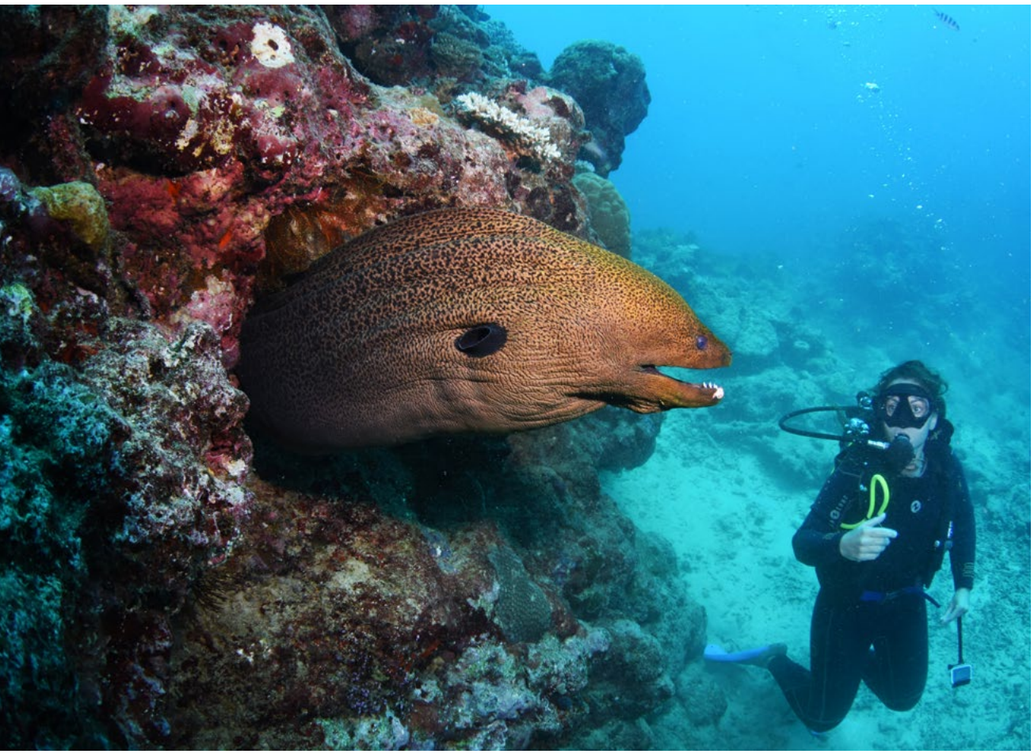
The most famous example of this is Valerie Taylor's relationship with a yellowmargin moray (*Gymnothorax flavimarginatus*) at Heron Island, Great Barrier Reef, called Harry. Throughout the 1970s, Val would feed, pat and play with this friendly moray, even pulling him out of his home and carrying him around. He recognised and trusted Val, even if she only visited Harry once a year. Val later had a similar relationship with a spotted moray (*Gymnothorax isingteena*) in the Banda Sea, Indonesia.

Eating morays is not recommended as they have toxic skin and flesh. However, some cultures do risk eating morays. I found these fangtooth morays in a market in Morocco (right).

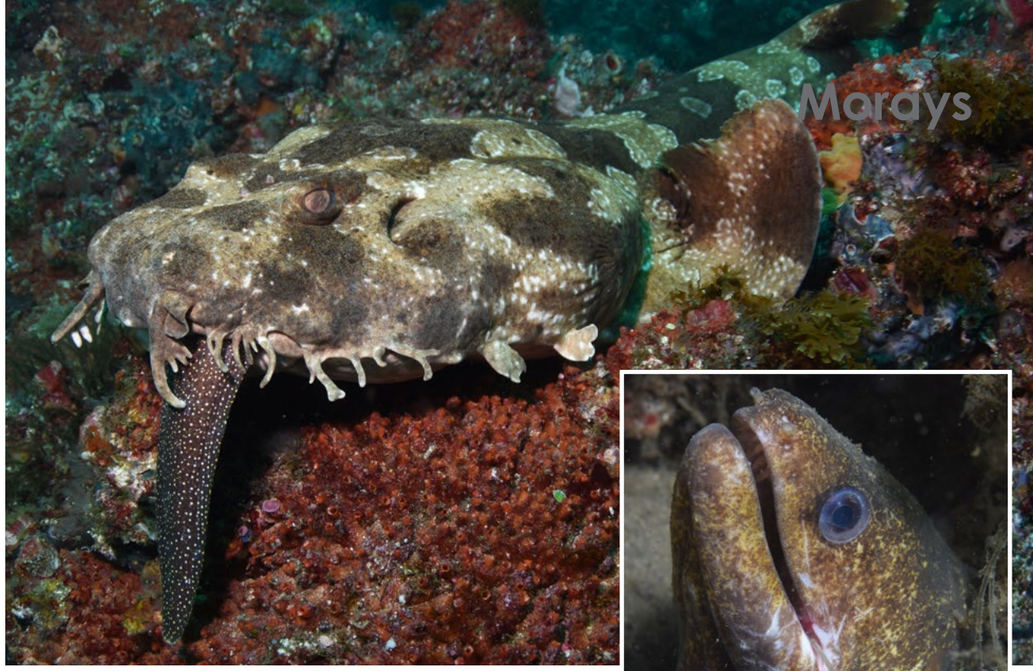
Feeding morays is not recommended, as numerous divers have been bitten in these situations. Apart from feeding incidents, how dangerous are morays? Morays are not normally aggressive, but accidents do happen, and divers have been bitten when placing their hands too close to a moray's head or home. However, moray attacks are rare, and morays have much more to fear from humans.

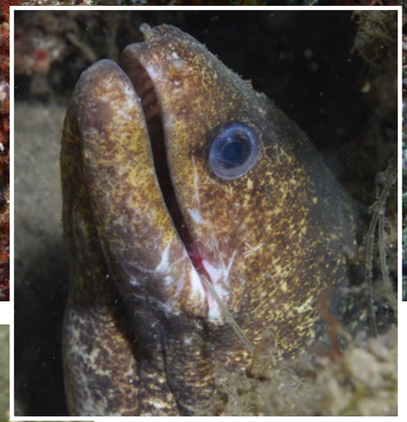
Fishing threats

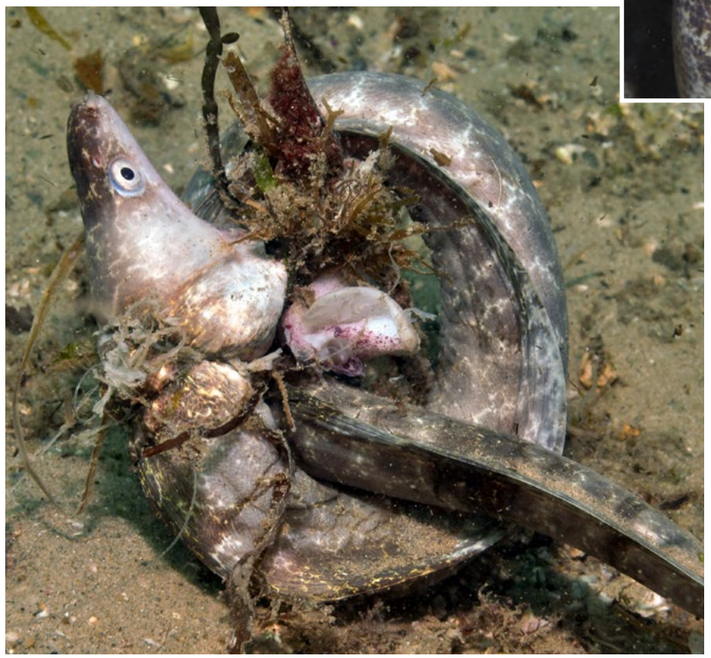
While not commonly targeted for food, morays often fall foul of fishers, and unfortunately, some kill the poor moray either thinking they are performing a public service or getting rid of competition. However, most fishers cut captured morays free, not wanting to tangle with a mouthful of sharp teeth.



Giant morays are often attracted to shark feeds and even muscle out the sharks. This one was photographed at a shark feed at Beqa Lagoon, Fiji.







This unfortunate sieve-patterned moray has tried to twist itself in knots to escape a hook and fishing line, sadly without success (left); This poor highfin moray has swallowed a fishhook and still has fishing line protruding from its mouth (above); A number of animals eat morays, including sharks. I encountered this spotted wobbegong shark eating a stout moray off Tweed Heads, Australia (top right)

This unfortunately leaves the hook in place in the moray's mouth, throat or stomach, which can lead to a slow death from septicaemia. I have occasionally found dead morays at popular fishing spots, with the poor moray tangled in yards of fishing line. Morays are also captured for the aquarium trade. How many are taken and die each year for the entertainment of a few is unknown.

Moray species

There are 211 recognised moray species that are split into two subfamilies and sixteen different genera based

The shy barred moray has short stumpy teeth and feeds on crustaceans and molluscs (left); The barred-fin moray is a species found on tropical reefs of the Indo-Pacific region (below); The geometric moray has a wonderful pattern of dots on its head (right); The spotted moray is easily confused with the very similar looking honeycomb moray (bottom right).

on similar body characteristics. Most species are placed in the subfamily Muraeninae, which I like to call the true morays. The eleven genera in this group have a continuous dorsal fin that starts above the gill opening and runs the length of the body, before wrapping around the tail and fusing with the anal fin. The other five genera are placed in the Uropterygiinae subfamily, or the snake morays. These morays typically have less obvious dorsal and anal fins starting farther down their body, closer to the tail, and many have a more rounded snake-like body.

The true morays

Gymnothorax. Most of the familiar morays that divers encounter are placed in the very large *Gymnothorax* genus. All 125 species in this genus have very sharp fang-like teeth. The best-known member of this genus is the giant moray (*Gymnothorax javanicus*), a common eel seen throughout the Indo-Pacific region. This large moray often makes an appearance at shark feeds, muscling out the sharks, and has been known to eat other morays. Another common member of this genus is the honeycomb moray (*Gymnothorax favagineus*). This black-and-white patterned moray is found in the Indo-Pacific region and is reported to reach 3m in length. This species is easily confused with the very similarly patterned spotted moray (*Gymnothorax isingteena*). However, this species has a sparsely spotted pattern and only grows to 1.8m in length.

While members of this genus are found around the world, they are far more common in the tropical and subtropical waters of the Indo-Pacific region. Common tropical members of this genus include the white-eyed moray (*Gymnothorax thyrsoideus*), the fimbriated moray (*Gymnothorax fimbriatus*) and the barred-fin moray (*Gymnothorax zonipectus*). The prettiest member of this genus found in the western Indian Ocean is the geometric moray (*Gymnothorax griseus*), which has a pattern of dots on its head. One of the few members of this genus found in the temperate waters of Australia and northern New Zealand is the yellow or green moray (*Gymnothorax prasinus*).

Echidna. The eleven members of the *Echidna* genus all have stumpy-blunt teeth to crack the shells of crustaceans and molluscs. The wide-ranging snowflake moray (*Echidna nebulosa*) is the best-known member of this genus, easily identified by its black and white bands and yellow spots. This species grows to 75cm and is another species found in the Indo-Pacific region. The barred moray (*Echidna polyzona*) is found in the same region and is of a similar size, but like many other members of this genus, it is shy and rarely seen.

The fangtooth moray is a spectacular member of the family found in the eastern Atlantic (right); Black moray residing on a shipwreck in the Canary Islands (below)

The beautiful zebra moray is another species lacking sharp teeth (top right); With flaring nostrils and beard-like whiskers, the ribbon eel is one of the most unique members of the moray family (lower right)

Gymnomuraena. The zebra moray (*Gymnomuraena zebra*) is very similar to the Echidna morays, having short blunt teeth, but is placed in a genus all by itself—*Gymnomuraena*. Found throughout the Indo-Pacific region, this pretty moray is brown with white bands and grows to 1.5m in length.

Enchelycore. The most spectacular morays are found in the genus *Enchelycore*. The 13 members of this family have long dagger-like teeth and a curved jaw that prevents them from completely closing their mouths. Most members of this genus also have remarkable colour patterns, including the dragon moray (*Enchelycore pardalis*). Although found throughout the Indo-Pacific, this extraordinary moray is only locally common to a few locations. The fangtooth moray (*Enchelycore anatina*) is another striking member of this genus that is found in the eastern Atlantic. My favourite from this group is the mosaic moray (*Enchelycore ramosa*) which grows to 1.6m in length. This attractive moray is only found in a limited area off the eastern coast of Australia and northern New Zealand.

Muraena. Twelve species make up the *Muraena* genus of morays. These eels typically have sharp teeth, and most are only found in the Atlantic Ocean. The Canary Islands is a good place to see one of these morays, with the black moray (*Muraena augusti*) often encountered by divers. This black-coloured moray has white eyes and grows to 1.6m long.

Rhinomuraena. The ribbon eel (*Rhinomuraena quaesita*) is the only member of the genus *Rhinomuraena* and some argue that it is so different from all other morays that it should be listed in its own separate eel family. These fascinating eels grow to 1.6m in length and have a very thin ribbon-like body. Ribbon eels typically live in sand and rubble, with their body mucus cementing their tunnel walls together so they can quickly slide in and out of their home. Two of the more unusual features of the ribbon eel are a set of large flaring nostrils and chin barbels, used to detect prey.

Pseudechidna. The white ribbon eel (*Pseudechidna brummeri*) is a close relative of the ribbon eel but is placed in a separate genus *Pseudechidna* all by itself. While it does have a ribbon-like body and resides in the sand and rubble, it lacks the large flaring nostrils of the ribbon eel, having a more traditional moray head decorated with small brown spots. This is another Indo-Pacific species that grows to 1m in length.

The snake morays

Scuticaria. The two members of the *Scuticaria* genus are typical of morays in the Uropterygiinae subfamily, they almost lack dorsal fins and have rounded bodies. The tiger snake moray (*Scuticaria tigrina*) is found throughout the Indo-Pacific region but is only occasionally seen by divers at night. This blotched coloured moray grows to 1.4m in length and is sometimes seen in the Red Sea and Southeast Asia.

The yellowmargin moray is a widespread species found throughout the Indo-Pacific region (above); The blotched snake moray is another shy species that is rarely seen by divers (top left)

The white ribboned eel looks very similar to the ribbon eel but is placed in a separate genus (right); The tiger snake moray is a shy species occasionally seen on Indo-Pacific reefs (below)

Uropterygius. The 20 morays of the genus *Uropterygius* are rarely seen by divers. The only member of this genus that I have encountered is the blotched snake moray (*Uropterygius fasciolatus*). This species grows to 60cm in length and is very shy.

There are a number of other genus groups that I have not included, mainly because they are rarely seen by divers.

Moray research

With their dangerous reputation, it is understandable why little research has been done on morays. One of the few researchers to study morays was Joshua Reece, when he did his Ph.D. at the University of Hawaii in 2005. He was inspired to study morays after a dive of Oahu and seeing five different moray species sharing the same lair. He wondered how this could be, especially after capturing them and finding out they were eating the same prey. This broke the basic rules of nature on diversity, similar species do not exploit the same niche as one will always prevail, but morays do not appear to follow this rule.

Collecting morays across the Indo-Pacific region, with a focus on the undulated moray (*Gymnothorax undulatus*) and yellowmargin moray; Reece discovered that morays are the most cosmopolitan of all reef fishes. Studying their genes, the researchers looked for unique alleles, or variants, that indicated any geographic separation. And while they found variations between the genes of individual morays, they discovered nothing related to geographic separation. This was quite astonishing; how can morays over 20,000km apart have no distinctive regional genetic markers?

The researchers came to the conclusion that morays are genetically homogeneous because of their long larval stage, which allows them to widely disburse and constantly stir the gene pool. Biologists have theorised that the longer the larvae stage of a fish, the more genetically homogeneous the species and the wider its distribution. Some morays remain in their larvae stage for months and even years. While some fish also have long larval stages, moray larvae are the only fish found to cross vast ocean distances and survive barriers that other fish larvae never manage to bridge. This theory also explains why some morays have a limited range and others are widespread, the wider distribution linked to the longer larval stage of some species.

The grey moray is a common species at the Poor Knights Islands and often boldly sits out in the open or is draped over sponges and kelp (right)

Moray eels are the most cosmopolitan of all the reef fishes, with the undulated moray found across the Indo-Pacific region (left); Large honeycomb moray hanging out of a hole at Kanduohgiri in the Maldives (right)

Unfortunately, the research did not find answers to why a great variety of moray species can share the same niche of food, habitat and distribution, and how over 150 species evolved in the Indo-Pacific region in the first place.

Another recent study in the Caribbean found that morays are more common on reefs with higher levels of human pressure, with the researchers theorising that with the removal of sharks, morays have become the top predators on these reefs. In addition, another recent study of California morays (*Gymnothorax mordax*) off Catalina Island discovered that morays residing in marine protected areas were longer, older, heavier, in better condition and in greater abundance than the morays in unprotected areas.

Special moray dive sites

Brisbane, Australia. Morays are seen at dive sites across the planet, but being shy and retiring, they are sometimes hard to find. I feel very fortunate to live in an area where morays are very common, in Brisbane, Australia, right in the centre of the Indo-Pacific. This subtropical region is home to over a dozen species of moray.

On most dives, I encounter between five and ten morays and have found that some species are very common, others locally common, some only occasionally seen and some extremely rare. A few morays that are recorded in the area I have never seen, even after diving this region for almost 40 years. I am not sure if this is a case of some species being abundant and others sparse in numbers, or simply that some are extraverted and happy to be seen and others are introverted and prefer to remain hidden—or maybe a combination.

Poor Knights, New Zealand. While I feel blessed to be able to see such a great variety of morays at my local dive sites, they are not the best moray destinations I have found. Over the 40 years I have been diving, I have found only two special sites where the morays are the dominant creatures—the Poor Knights Islands in New Zealand and a wonderful dive site in the Maldives called Kanduohgiri.

The Poor Knights Islands are located in a temperate zone, so it is a big surprise that so many subtropical moray species are found here. The reason they are here is due to the warm waters of the East Australia Current, made famous in the film *Finding Nemo*, warming the local waters and also bringing subtropical visitors, including morays.

At every dive site at the Poor Knights, divers see moray eels, and not just one or two, but dozens upon dozens. The most common species are two temperate morays, the yellow moray and the endemic grey moray (*Gymnothorax nubilus*). The grey morays are particularly obvious; unlike most morays that hide in a lair, these morays like to drape themselves over sponges and kelp.

Two other morays are commonly seen at the Poor Knights in smaller numbers, the spectacular mosaic moray (*Enchelycore ramosa*) and the more low-key low-fin moray (*Gymnothorax porphyreus*). If that was not enough, two less-common species are seen from time to time, the mottled moray (*Gymnothorax prionodon*) and the Lord Howe moray (*Gymnothorax annasona*).

However, I got a big surprise when diving this area when I found a completely unexpected moray—the Y-patterned moray (*Gymnothorax berndti*).

A completely unexpected find at the Poor Knights Islands was this deep-water Y-patterned moray (above); The lowfin moray is a little harder to find at the Poor Knights Islands (centre)

This pretty moray, with its black-and-white reticulated pattern, is found throughout the Indo-Pacific region, but is one of the few deep-water species found at depths up to 300m. What it was doing in 15m of water at the Poor Knights I do not know, but I was extremely excited to photograph this rare moray. If you are into morays, the Poor Knights Islands are a must-do destination.

Kanduohgiri, Maldives. The most specular individual moray dive site I have ever visited is located just north of the Maldives capital of Malé. I visited this site on the liveaboard *Emperor Virgo* as our checkout dive on a week-long dive trip. The dive brief mentioned lots of fish and eels, but I was not prepared for the sheer number of morays at Kanduohgiri.

Seconds after descending, I encountered the first eel, a large giant moray hanging out of a hole in the reef wall. I was just about to photograph this moray when we spotted a more spectacular sight nearby, a honeycomb and giant moray sharing a hole. Beyond this pair of morays was another large honeycomb moray, and another, and another.

During the dive brief, the chief guide Issey had mentioned that this site was adjacent to a tuna processing plant and was home to a few morays, but over the course of this dive, I saw well over one hundred morays. The large honeycomb morays were easily the most spectacular with their bold black-and-white colouration, but we also saw white-eyed, yellowmargin, giant, snowflake and undulated morays. And with a limited number of hiding places, most holes were packed tight with five, ten and even 20 morays. This has to be the greatest collection of morays on the planet!

Afterthoughts

Morays may be still feared and hated by the non-diving general public, but these much-maligned and misunderstood creatures are slowly revealing their secrets, which is showing them to be some of the most fascinating of all the reef fishes. ■

There are so many morays at Kanduohgiri that they often have to share holes in the reef. This hole was home to two honeycomb morays and a giant moray (above).

Nigel Marsh is an Australian underwater photographer and photojournalist whose work has been published in numerous magazines, newspapers and books, both in Australia and overseas. Over the last 40 years, he has dived extensively around Australia and also throughout Asia, Pacific Ocean, Indian Ocean and the Caribbean. He has also produced a number of diving-related books, including two dive guidebooks with Neville Coleman: Dive Sites of the Great Barrier Reef and the Coral Sea *(New Holland, 1996) and* Diving Australia *(Periplus Editions, 1997). In addition, he has also self-published a book—*HMAS Brisbane Queensland Coral Warship *(Nigel Marsh Photography, 2011), a photographic exploration of one of Australia's most popular dive sites. He has recently been busy working on a series of children's books on marine-related subjects* (A to Z of Sharks & Rays, Exploring Shipwrecks, Crabs & Crustaceans, Weird & Wacky Fish) *and a series of dive guides* (Underwater Australia, Muck Diving, Coral Wonderland, Diving with Sharks) *for New Holland Publishers. For more information, visit the author's website:* ***nigelmarshphotography.com***.