MARINE MIMICS

FIENDISH FISH

The marine parks managed by the Department of Conservation and Land Management (CALM) are essential to protect many important underwater ecosystems in Western Australia. They aid in preserving both common and rare species of fish, invertebrates and plants. Many of these creatures have evolved their own ingenious methods to help their chances of survival. Some adaptations, such as mimicry, are so bizarre that one wonders how they could ever have evolved.

BY ANN STORRIE

To look like something you are not is one of the animal kingdom's greatest adaptations for survival. To be inconspicuous within one's surroundings, or to mimic another species that is harmful or unpalatable, is often the key to an animal's success, especially in the sea. Mimics may wish to hide from predators, or to render themselves invisible to the creatures on which they feed. Others are highly visible and encourage their prey to come to them.

Whether you dive in the Rowley Shoals Marine Park in the north, or in the Archipelago of the Recherche in the Southern Ocean, if you look carefully, you will find a mimic. Some fish have taken on the appearance and shape of another fish species that is very successful at surviving. One such species that is found from the Shark Bay Marine Park northwards is the false cleanerfish (*Aspidontus taeniatus*). This fish mimics the cleaner wrasse (*Labroides dimidiatus*). The real cleaner wrasse is a conspicuous, dainty little fish, which darts around the bodies and heads of large, predatory fish. With relative immunity, it can enter the mouths and gill chambers of these predators to gently pick off parasites, thus providing a cleaning service that is respected and sought after by many of the reef's inhabitants. The false cleanerfish, however, is not even a wrasse, but a blenny with enlarged fangs in its lower jaw. It resembles the cleaner wrasse almost perfectly in shape, size and colour. Even its juvenile stage displays the darker blue and broader black stripe of the young cleaner wrasse. The blenny's swimming motion also mimics the wrasse's jerky movements. Fish that approach the blenny expecting an enjoyable cleaning session will suddenly lose a chunk of skin, scales or fin!

A less aggressive marine mimic is the saddleback leatherjacket (*Paraluteres prionurus*). It looks like Valentin's pufferfish (*Canthigaster valentini*) which, like all pufferfish, contains a deadly toxin in its flesh. Predators recognise this fish by its bright, distinctive markings, and avoid eating it. By looking like the pufferfish, the leatherjacket is mistaken for the inedible species, and left alone. This tactic is also used by several species of fish that mimic the sabretooth blennies. As the name suggests, sabretooth blennies have large teeth in the lower jaw. They appear to be used mainly for defence. If you look like a sabretooth, predators are more likely to leave you alone.

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The venomous stonefish looks for all the world like a rock, especially as it remains remarkably still for long periods.

Above: The sea whip goby aligns itself flat against the sea whip. Often, its eyes are the only parts that give it away.

Left: Are these Valentin's pufferfish or saddleback leatherjackets pretending to be the inedible pufferfish?
The leatherjacket has a dorsal spine, but it is often difficult to see if it is laid flat on the back.
Photos – Ann Storrie

BLENDING IN

Unlike fish that copy other fish, most mimics use camouflage to blend into their surroundings. Many fish look similar to plant leaves, algae, corals, sponges or rocks. The estuarine stonefish (*Synanceja horrida*), with its venomous spines, occurs from the Shark Bay Marine Park northwards. It blends into the reef so well that it is rarely seen by divers, and unfortunately for the diver or wader, it is sometimes trodden on. These stonefish have a tough, warty skin that resembles rocks and rubble. Their skin secretes a sticky mucous to which sand, mud and silt adheres, thus enhancing its camouflage. In addition, the stonefish often partially buries itself, with only its head, mouth and the top of its body protruding above the sand. Its swivelling eyes sometimes reveal its presence to perceptive divers. The stonefish may remain buried and almost motionless for days at a time, and it can even skip breath when prey approaches. When it strikes, it does so with a remarkably swift, upwards movement that takes the prey totally by surprise.

Like the stonefish, all members of the scorpionfish family blend into their surroundings. Many, however, are brightly coloured with what is often called disruptive coloration. The colours are designed to match the sponges, ascidians and algae of the reef. The mottled patterns also help to break up the fish's outline. Many scorpionfish possess fleshy extensions, or weed-like appendages on their body and fins. This gives them an irregular texture like the underwater surface on which they rest. Some are very common in the Marmion Marine Park and around Rottnest Island. The large western red scorpioncod

Above: This flounder can barely be distinguished from the sea floor.

Above right: Glauert's anglerfish is so similar to a sponge that divers have even poked it and not recognised it as a fish. Ironically, it can engulf prey faster than any other vertebrate on Earth.

Right: The western red scorpioncod is very common in local waters, but it is not always easily seen on the colourful reef.
Photos – Ann Storrie

(*Scorpaena sumptuosa*), for example, can perch on top of the reef, yet remain almost invisible to its prey and passing divers. It is always wise to watch where you place your hand if resting it on the reef.

Flatheads are bottom-dwelling fish that spend most of their time lying on the seabed, buried under a fine layer of sand or silt. Along with this protection, flatheads possess special pigment-laden cells called chromatophores. These are found in the skin and enable the fish to change colour to suit the underwater surface upon which they land. Flatheads also have a special membrane over their eyes. It is a mottled, web-like net that helps to camouflage the eyes, which protrude from the sand to watch for prey. This beautiful membrane is like a fingerprint in that it's pattern is unique to each fish.

Flounders have evolved a unique way to watch their prey while lying on their side. These fish bury themselves on their side, which is almost flat and easy to cover with sand. Most fish, of course, have eyes on either side of the head. So do the larvae of flounders and other flatfish. As the larva matures, however, one of the eyes gradually moves either around, or through, the head. The result is that both eyes end up on the same side of the body. Some species have eyes on their left sides, others on their right. When the flounder buries itself with the eyes' side up, its two tiny, beady eyes swivel in all directions to watch for both prey and predators.

SPONGE OR SILENT PREDATOR?

One of the most highly evolved examples of mimicry is seen in the anglerfish. Glauert's anglerfish is sometimes seen under the Busselton

Top left: Flatheads, like flounders, bury themselves in the sand and are a similar colour to their surroundings.

Centre left: Even when pipefish are in the open water, they are still quite difficult to see when close to the reef, as they are so thin.
Photos – Ann Storrie

Left: Unless you look carefully, the leafy seadragon looks like a piece of floating seaweed.
Photo – Peter & Margy Nicholas/Lochman Transparencies

Jetty. Its colour, texture, behaviour and structure so perfectly resemble a sponge that divers have been known to poke and prod it, and still not recognise it as a fish. The anglerfish can be bright orange, yellow, black or almost any colour to match the surrounding sponges. Its skin is pitted with large and small cavities like a sponge, and its modified fins resemble little feet and stabilise it on the reef. These fins are often covered with a growth of algae to aid camouflage.

As their name suggests, anglerfish attract their prey with a lure. The lure is an extension of the first spine of the dorsal fin, and it is like a tiny rod with a 'bait', known as the esca, on the end. Even the esca looks like something that it is not. In our local anglerfish, it resembles a piece of floating tissue, but other species have escas that mimic polychaete worms, shrimps or tiny fish. The anglerfish manipulates the esca to simulate the natural swimming motion of the creature that it mimics. When the prey approaches to take the lure, the anglerfish opens its enormous mouth and sucks the prey in. Most anglerfish can enlarge their mouth by a factor of 12, and can do so in about six milliseconds. The negative pressure created by the expansion of the mouth and gill cavity sucks water and prey in. This gives the anglerfish the distinction of being the fastest vertebrate predator on Earth!

BODY POSTURE

Body posture is used by some species to mimic their surroundings. The fish assumes a position that makes it less likely to be seen against its background. Pipefish are good examples. Some species swim in a vertical position, and this, together with their elongated shape, allows them to resemble the seagrass in which they live. Others curl around the reef to take advantage of their colours, which are similar to the surrounding invertebrates. Tiny 'sea whip' gobies always lie flat along the sea whip, or stem, of a gorgonian coral. If you come too close, they quickly whip around to the other side, blending in perfectly with the colour of the gorgonian.

Possibly the most successful marine mimic is the leafy seadragon (*Phycodurus eques*), also a member of the pipefish and seahorse family.

The sponge-like appearance of the anglerfish makes it easier to tempt prey with its dangling lure.
Photo – Ann Storrie

Seadragons are fish with tube-like snouts and bony plates, instead of scales, on their bodies. They have many leaf-like appendages that resemble seaweed. The leafy seadragon has evolved to such perfection that sometimes small fish will hide among them, mistaking them for weed. The dragons drift near real seaweed, gently floating back and forth in the current. Buoyancy control is thus very important, and these fish must fill their swim bladders with air from the surface when they first emerge from the egg.

Like all members of their family, seadragon males carry and incubate the eggs until they hatch. During mating, the female leafy seadragon lays between 100 and 250 eggs on the underside of her partner's tail. Here, they are fertilised and incubated in a 'brood pouch', which is a wrinkled area of cup-like indentations under the tail. The young hatch as well-developed miniatures of their parents, except that their leafy appendages take a few weeks to develop.

Leafy seadragons are totally protected in Western Australia. They are found only in southern Australian waters, from Lancelin in Western Australia to Wilsons Promontory in Victoria. If you find one, please don't disturb it, or take it to the surface to show your friends. Its swim bladder may rupture. Of course, if you do find one, you are among very few lucky divers who have seen one in the wild. Take the time to marvel at its shape, form and movement. Watch as its tiny snout darts forward to catch small shrimps and other planktonic animals. But if you take your eyes off it for a second, it will vanish in the weed. The leafy seadragon is a masterpiece of mimicry in the sea.

Ann Storrie is a freelance writer and underwater photographer. She has co-authored two full-colour books (*The Marine Life of Ningaloo Marine Park and Coral Bay* and *Wonders of Western Waters: the Marine Life of South-Western Australia*), which also feature many of her photographs. Both books are published by CALM. Ann can be contacted on (08) 9385 9355.

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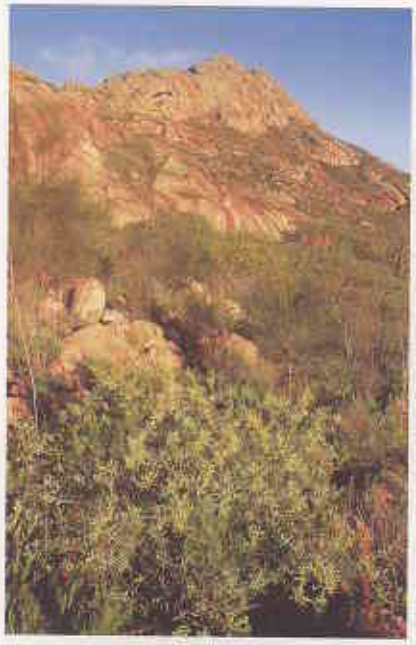

Peak Charles and Peak Eleanora, protected within Peak Charles National Park, form granite islands in a sea of bush. See page 10.

The Swan River is a recreation area for humans and a home for migratory birds. See page 16.

A partnership between State and Commonwealth goverments, and a group of pastoralists is helping to fill the gaps in the conservation estate. See page 43.

Butterflies have a short life span, but they bring pleasure to many people who visit Rottnest Island. See page 23.

Many marine creatures have evolved ingenious survival methods. See page 49.

FEATURES

REGULARS

COVER

Well-known Australian artist Ken Done captures the colour and turbulence of the horizontal waterfalls on the Kimberley's Wandjina Coast.

Painting by Ken Done
Racing Tide, Kimberley Coast, May 1999
(51 x 36 cm) oil crayon and gouache on paper.

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