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LIFE E-NEWSLETTER

LIFE UNDERWATER :
Exploring the blue world

WELCOME TO LIFE UNDERWATER!

We are delighted to present our new issue, LIFE, the e-newsletter of the Department of Zoology, marking the beginning of this year's edition.

This new issue takes us beneath the waves, with marine life as our central theme. Through this edition, we will explore fascinating topics such as bioluminescence, some of the ocean's strangest creatures, life in the deepest parts of the ocean, and the colourful world of coral reefs.

To make this journey even more engaging, we have also included a photo gallery that captures the beauty and diversity of life underwater.

So, dive in and join us as we explore the wonders hidden beneath the surface! 🌊🪸

GLOW IN THE DARK:
BIOLUMINESCENT MARINE LIFE

Why Marine Life Lights Up (And Why It's Super Cool)

I was scrolling through social media late at night a few weeks ago when I came across a video of a surfer cutting through pitch-black waves that were glowing bright neon blue. At first, it looked like a scene straight out of Avatar or some CGI effect. But after digging into it, I realized it was completely real.

It's called bioluminescence, and it basically means living things producing their own light. While we usually think of fireflies on land, the ocean is where this natural glowing party is actually happening. It turns out that a huge chunk of deep-sea creatures can literally light up in the dark.

How Does Marine Bioluminescence Actually Work?

You don't need a degree in biochemistry to get the basic idea. Marine animals produce light through a simple chemical reaction inside their bodies. Think of it like cracking a glow stick. When you snap a glow stick, two chemicals mix together and start glowing. In sea life, it's a similar setup: A molecule called luciferin (the stuff that actually makes the light). An enzyme called luciferase (which speeds up the reaction). When luciferin reacts with oxygen, Luciferase triggers it to release energy in the form of light. Unlike a regular lightbulb, which gets hot after being on for a while, bioluminescent light is "cold light." Almost all the energy goes Straight into making light rather Than heat, which keeps the animal From cooking itself from the inside Out.

Who Is Glowing Out There

It isn't just one type of fish doing this everything from microscopic algae to deep-sea predators have their own glow-in-the-dark features.

1. Dinoflagellates (The Tiny Beach Party)

These are tiny single-celled organisms floating near the ocean surface. When waves crash or when you swim through the water, you disturb them, and they flash a quick blue light. If millions of them gather together, the entire shoreline starts glowing.

2. The Deep-Sea Anglerfish (The Creepy Predator)

Anglerfish live way down in the pitch-black depths of the ocean. The females have a small rod dangling right in front of their faces with a glowing lure at the tip. Unsuspecting prey gets curious, swims over to check out the shiny light, and ends up as dinner.

3. The Vampire Squid (The Distraction Artist)

Instead of shooting regular dark ink like a normal squid, the vampire squid releases a cloud of glowing bioluminescent mucus when it gets scared. It completely dazzles and confuses predators, giving the squid just enough time to slip away into the dark.

But Why Do They Do It?

Making light takes energy, so animals aren't just doing it for looks. It's all about survival.
Attracting Mates: Just like fireflies on land, some sea creatures flash specific light patterns to signal to potential partners.
Hunting: Like the anglerfish, predators use light as bait to lure in hungry fish.
Defense and Camouflage: Glowing can actually help creatures hide. Some fish glow on their undersides to match the faint sunlight coming down from the surface. Predators looking up from below can't see the fish's silhouette because it blends right in with the light above. Scientists call this counterillumination

Why Should We Care?

Besides being fascinating to look at, scientists are actually studying bioluminescent creatures to help solve human problems. For instance, researchers are using these glowing proteins in medical science to track how cells function or to monitor treatments in real time.
It’s amazing that a tiny chemical reaction happening thousands of feet under the ocean is helping us design better medical tech. The ocean is full of strange, surprising life, and bioluminescence is definitely one of its best tricks. Next time you see a clip of glowing blue water, you'll know it's just millions of tiny organisms putting on a natural light show.

MEET THE OCEAN'S STRANGEST CREATURES.

When we think about the ocean, we usually imagine colourful fish, dolphins, whales and beautiful coral reefs. But the deeper we go into the ocean, the stranger life becomes. There are creatures that look like aliens, animals that can produce their own light, and even fish with features that seem almost impossible.The deep ocean is a huge and mostly unexplored world. Because sunlight cannot reach the deepest parts, animals living there have developed some really unusual ways to survive.

Let's meet some of the strangest creatures hiding beneath the waves.

The Barreleye Fish : The Fish With a Transparent Head

The barreleye fish looks like something from a science-fiction movie. Its head is covered by a transparent, fluid-filled area, and its eyes are inside this unusual structure. Its tube-shaped eyes can point upwards to look for the shadows of animals above it. They can also move forward when the fish wants to look at something in front of it.What makes it even stranger is that the fish's eyes can collect very small amounts of light. This is extremely useful in the dark deep sea.

The Dumbo Octopus : The Ocean's Flying Octopus

The Dumbo octopus gets its name from the famous Disney character because of the large ear-like fins on its head. Instead of swimming quickly like some other octopuses, it uses these fins to move through the water. It lives in the deep ocean, where sunlight is almost completely absent. These octopuses can be found at depths of several thousand metres. Just imagine seeing one floating silently in the darkness of the deep sea!

The Goblin Shark : The Shark With a Jaw That Shoots Forward

Sharks are already interesting, but the goblin shark takes things to another level. It has a long, flattened snout and strange-looking jaws. When it finds prey, its jaws can move rapidly forward to grab it. This is called a protrusible jaw. Its pinkish body and unusual shape make it look very different from the sharks we normally see. Luckily for humans, goblin sharks live deep underwater, so we rarely come across them.

WHY ARE DEEP-SEA ANIMALS SO STRANGE? :

The deep ocean is a completely different environment from the surface. There is very little or no sunlight, temperatures are often very low, food can be scarce, and the water pressure is enormous.

Because of these conditions, animals have developed special adaptations. Some have huge eyes to collect more light. Others have very large mouths so they can eat whatever food they find. Some produce their own light, while others have soft bodies that can survive extreme pressure.

Basically, the stranger an animal looks to us, the more likely there is a useful reason behind it.

CORAL REEFS:

Cities beneath the sea

What makes these coral reefs

When I first came across the word corals, I wondered if they were some small animal living in the oceans or if they were some pigmented plant species? Little did I know that these vibrantly coloured structures were ecosystems made from the symbiotic relationships between polyps and algae. Polyps are a type of small soft invertebrate animals that belong to the phylum Cnidaria. These animals secrete carbonate which they then use to make hard, rock-like shells to protect and support their structure. As these structures keep getting formed layer by layer, a coral reef gets created. The various bright and lively colours seen in these reefs is due to the presence of an algae called Zooxanteallae. The polyps and the algae harbour a very healthy and mutually beneficial relationship where the algae provides the corals with food while in return the polyps offer them a home. In the wide blue ocean, coral reefs are very scarcely distributed, with the famous ones being the Great Barrier Reef in Australia, the Belize Barrier Reef and the Red Sea Coral Reef among many others. These reefs of various types, shapes and sizes are home to hundreds of aquatic species and can be called the rainforests of the sea.

Types of coral reefs

There are many types of coral reefs present in the seas and oceans. However, there are 5 main types that are most frequently seen:

Fringing reefs : These are one of the most common reef types which grow near the coastline around islands and continents.Here the reef is separated from the main coastal borders by narrow, shallow lagoons that are mostly less than 2 metres deep. This type of reef is commonly found in the Bahamas and the Red Sea region and they support a large, diverse ecosystem due to constant wave movement and proximity to coast.

Barrier reef : This another major type of coral reef is characterised for being separated from the coast by deep wider lagoons. They run parallel to the coastline and act as a physical barrier against rough ocean waves thus earning their name. It is possible, one might confuse a barrier reef with a fringing one, however a striking contrast is seen between their distance from the coast and the depth of the lagoon that separates them from the mainland. The largest barrier reef, or the reef in which the film “Finding Nemo” is set, The Great Barrier reef in Australia, spans roughly more than 2,000 km in length, with a width of 60 to 250 km. It has an area of some 350,000 square km and is often considered the largest structure ever built by any living creatures.

Atoll reefs : These are rings of coral that create protected lagoons in the middle of the sea. These reefs generally found in warm tropical oceans like the Pacific and Indian oceans are made of really long ribbons of corals that form closed structures around the lagoon. They develop over millions of years as living coral builds upward while an underlying volcanic island slowly sinks. Charles Darwin had suggested in his 1842 monograph, The Structure and Distribution of Coral Reefs, written during his time on the HMS Beagle that atolls represent the final stages of a reef which is growing around a volcano that has been dead for a very long time.

Patch Reefs : Patch reefs are small, isolated reefs that grow up from the open bottom of the island platform or continental shelf. These reefs are in close proximity to each other but are physically separated by sand rings. They usually occur between fringing and barrier reefs but rarely reach the surface of the water. Formed on rocky or fossilized coral outcroppings in ten to twenty feet of water these coral reefs appear in varying sizes.

Why they are important

Apart from being a home to hundreds of species, coral reefs support over 500 million people around the world by providing food, income, coastal protection and more. They cover less than 0.1% of the ocean floor yet support 25% of all marine life and act as a safe breeding ground for many species thus contributing and majorly sustaining the fishing industry. Local tourism like hotels, resorts and diving industries thrive in areas with coral reefs as they attract businesses from all across the globe.

These reefs also contribute majorly to the medical field by providing chemicals (from organisms that dwell there) which have been proven to be useful for various cardiovascular diseases and even cancer. Apart from all these important uses, coral reefs serve as a strong barrier against rough waves, high tides, storms etc, thus protecting the coast from disasters.

What is happening to them now: Coral bleaching

According to the research conducted, science shows that 75% of the world's coral reefs are currently threatened and by 2050 100% of reefs will be threatened if we don't take action now.

These reefs are highly sensitive to climate and water conditions which has led to their deterioration over time. One of the major visible effects seen now is coral bleaching where these colourful corals turn ghostly white. When the temperature of the ocean begins to rise due to global warming, overall temperature increases, excessive sunlight the corals begin to expel the algae from themselves. Due to this, these reefs become very vulnerable to starvation and die. Apart from this, ocean acidification, excessive sea level rise and stronger storms are a huge threat to the already vulnerable reefs.

What can we do

Small changes we make in our daily lives can make big differences towards the conservation of our coral reefs. Saving water, avoiding single use plastic, using reef friendly sunscreens, conscious snorkeling and diving can all contribute to protecting these vulnerable ecosystems. On a global scale, reducing global warming will directly reduce coral bleaching. However this will only be possible if all countries come together and develop practical and applicable policies which when implemented will protect our reefs. In the end one must remember that these reefs and the oceans are the reasons why mankind is able to live on earth in the very first place.

PHOTO GALLERY

Oriental garden lizard
(Calotes versicolor)

By Tanvi (SYBSc)

European garden spider
(Araneus diadematus)

By Riya (SYBSc)

Ghost crab
(Ocypode species)

By Lawanya (SYBSc)

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EMAIL US: editor.lifenewsletter@gmail.com

INSTAGRAM: http://www.instagram.com/zoologylifenewsletter

MENTOR: DR. MADHAVAN GOPALAN, ZOOLOGY DEPARTMENT

EDITOR: AARATI ASHOKKUMAR

TEAM MEMBERS: Lawany (SyBSc),Riya (SyBSc),Tanvi (SyBsc),chetna (SyBsc), Masher (SyBsc),Tisya (FyBsc),Sharanya (FyBsc),Amit(FyBsc)