



# Jellyfish in our Coastal Seas

Ouch! How many of us have felt the pain of a jellyfish sting? We see them washed up on our beaches and most of us avoid them with a shudder. But have you ever stopped to look at them? Have you ever wondered what they are made of? What is their function in the seas that surround the island of Ireland? Jellyfish are some of the most abundant and noticeable members of our coastal marine fauna. Individuals can grow to one metre in diameter and weigh as much as 200 kg. Jellyfish blooms (or swarms) can extend for kilometres and contain millions of individuals. Even though we see these creatures all the time, we have only a

basic understanding or appreciation of their diversity, ecology and life history. Until very recently jellyfish have been neglected by researchers worldwide. This is largely to do with the difficulty in studying these delicate and often transparent animals. Novel techniques such as beach surveys, and pioneering new technologies such as deep-sea submersibles, scuba diving and even observing jellyfish from aircraft are beginning to provide a new appreciation of their diversity. Once considered unimportant, jellyfish are now known to play a large role in the dynamics and functioning of our coastal marine environments.

## What are Jellyfish?

Jellyfish belong to a group of animals called Cnidarians (pronounced nigh-dare-ree-ane's), which also includes sea anemones and corals. They have a very simple body plan (e.g. no heart, bones, liver, brain, or lungs); they don't have a left and right side, and have 'stinging cells' that they use for food capture and protection.

## Composition

They are composed almost entirely of water (up to 96%) and use the muscles of their body wall to push against this fluid inside to create a pulsating swimming movement. The adult jellyfish or the medusa is typically bell or dome-shaped, very large, short lived (months rather than years), and swims. However, jellyfish are also present all year round in another form – the polyp.



*Crab eating jellyfish. Many jellyfish wash up on our beaches whereas others fall to the sea floor where opportunistic crabs such as this Velvet Swimming Crab may eat them. (©Nigel Motyer)*



*The Lion's Mane jellyfish has hundreds of tentacles that at times stretch out so finely that they become almost invisible to the unsuspecting swimmer or fish! Here the tentacles are in the contracted state and are as thick as a shoelace. (Patricia Byrne)*

## The polyp

The polyp is shaped like a minuscule vase (a few millimetres in height) with tiny tentacles attached around the rim. It looks something like a tiny sea anemone. It normally attaches to rocky substrates or shells in shallow coastal environments, and can live for many years. Importantly, the polyp produces the adult jellyfish (see life cycle figure on centre page).



*Pelagia noctiluca is an oceanic species and only occasionally makes an appearance in Irish coastal waters. It does not have a benthic stage (so no polyps) and spends its entire life swimming and reproducing in the water column. (©Nigel Motyer)*



*Sunfish in Tralee Bay - Sunfish are the largest bony fish in the world, at times measuring over 3 m in length and weighing up 2235 kg (2 tonnes). Each summer they visit our waters to feed on our many types of jellyfish. (Ronnie Fitzgibbon)*

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## Jellyfish in Irish waters

Ireland has five indigenous jellyfish species: Barrel, Blue, Common (Moon), Compass, and Lion's Mane. A sixth species (*Pelagia noctiluca*) also occurs, but as it is an oceanic species it only occasionally makes an appearance in our coastal waters. Contrary to what you may think, jellyfish are not carried at the whim of ocean currents and tides on to our beaches. Many jellyfish maintain their positions by swimming down when the tide is going out, and swimming up when the tide is coming in. In this way they can stay in their preferred habitats. For example, the Barrel jellyfish forms enormous blooms every year off Rosslare and Wexford Harbours, yet is rarely found elsewhere in such numbers. The Lion's Mane jellyfish prefers the cooler waters of the Irish Sea and especially the waters off Dublin. Even the Common jellyfish, which is the most widespread species, seems to have a preferred habitat. It is most often located in harbours and estuaries but can, at times, form the most dense blooms. The Blue jellyfish and, in particular, the Compass jellyfish are found in highest numbers off the south and west coasts, and at times can be found throughout the entire Celtic Sea.

## Floats like a butterfly, stings like a bee

All jellyfish have stinging cells, which they use for protection and to stun and capture their food. These stinging cells are unique in the animal kingdom and only jellyfish and their close relatives (corals and sea anemones) possess them. The stinging cell is probably the most complicated single cell found in any animal, although very few of us appreciate this marvel of evolution when stung!

A stinging cell is like a tiny balloon with a miniature harpoon coiled up inside it. When the balloon bursts upon contact with an object, the harpoon is fired and injects venom into an unsuspecting animal (or person). Luckily for us, our skin forms quite an effective barrier against most of these 'harpoon' attacks. For example, the stinging cells of the Common jellyfish rarely break our skin and so have no effect. However, all stinging cells are strong enough to sting the more delicate tissues of our body such as eyes and lips. Some jellyfish, most notably the Lion's Mane, possess stinging cells that are much sharper and have no problem piercing our tough skin. The Lion's Mane jellyfish is Ireland's most venomous jellyfish.



Common (moon) jellyfish. (©Nigel Motyer)



Blue jellyfish. (Matthew Slightam)



Compass jellyfish. (Ailish Murphy)

*Barrel jellyfish stranded on a beach in Rosslare - Unlike all the other Irish jellyfish, the Barrel jellyfish has no tentacles. The cauliflower looking bit underneath the bell is made of eight branches, each one called an 'oral arm'. As the name implies, they are feeding structures, with thousands of tiny holes (or mouths) that suck up their plankton food. These jellyfish can weigh as much as 30 kg!* (Chris Wilson)



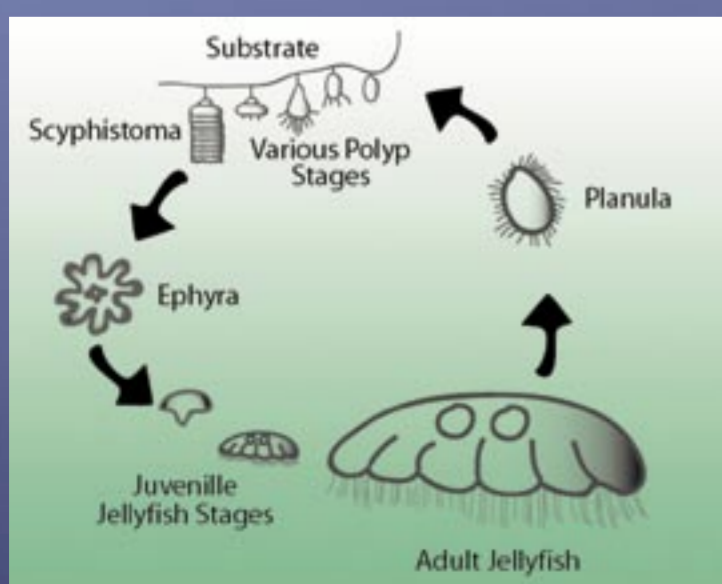
*Portuguese Man O'War - Often mistakenly thought of as a jellyfish, the Portuguese Man O'War is not a true jellyfish but a Siphonophore. It is actually a complicated colony of many different polyps that are attached to a large gas-filled float. These animals don't swim, but their float act like a sail to catch the wind and blow them around. As they are a tropical species, it is only after a long duration of persistent southwesterly winds that they wash up on our south west coast.* (Rowan Byrne)



*By-the-wind Sailor. This is not a jellyfish but is closely related. You often find thousands of them washed up on a beach. The main body floats like a raft on the sea surface, with a sail diagonally placed on top. As their name suggests, By-the-wind Sailors use the wind to move about. Underneath the float is a highly modified polyp that has feeding, reproductive and defensive parts that act together as a single organism.* (Tom Doyle)

## Lifecycle of Jellyfish

During the height of the summer, adult jellyfish produce gametes (sperm and eggs), which are released into the water column where they fuse to form larvae (planula). After a few days of swimming, the larvae settle on rocky substrates and shells, and then transform into polyps. The polyps undergo a remarkable transformation during winter and early spring. They begin to horizontally divide themselves up, i.e. they clone themselves! This is a pretty unique way of turning one animal into many. Each clone (called an ephyra) is released from the polyp and begins to pulsate immediately like a jellyfish. After many months of feeding and growing, this juvenile jellyfish will develop into a fully-grown adult. Some jellyfish are capable of over-wintering on the sea bottom (almost hibernating!) before returning to the water column the following spring.



Life cycle of Jellyfish. (Vincent Hyland)

*Turtle - The Leatherback sea turtle swims all the way from the Caribbean and west coast of Africa to feed on Ireland's abundant supply of jellyfish.* (Ian Slevin)



## Jellyfish and fisheries

As highly efficient predators, jellyfish blooms can consume large quantities of fish eggs and larvae, to such an extent that they may influence the number of fish available for us to capture! Furthermore, because jellyfish feed on fish food (i.e. plankton) they are also in direct competition with fish for the same resources. On the other hand, jellyfish may also be beneficial to fish and the fishing industry. For example, juvenile fish have been observed finding shelter under the bells of jellyfish. Indeed, if you imagine a bloom of jellyfish with approximately 10,000 individual jellyfish, each with 20 juvenile fish underneath, then you could have approximately 200,000 juvenile fish finding shelter under this floating jelly habitat! So at certain times, jellyfish blooms actually provide an important habitat for juvenile fish in a vast ocean.

## Are Jellyfish increasing globally?

There is a growing concern that jellyfish are becoming more abundant in our coastal seas. In the Bering Sea off Alaska, scientists documented a ten-fold increase in jellyfish abundance during the 1990s. Other examples include the Gulf of Mexico and the Sea of Japan. However, there are very few long-term datasets to help determine the exact causes of jellyfish increases. In some areas, extensive overfishing has removed many of the top predators (e.g. large fish species) thus leaving a 'niche' for jellyfish to fill. In other areas, recent shifts in climate may have driven these unprecedented increases in jellyfish abundance. In Irish waters it is impossible to say whether we have experienced any increase in jellyfish. The closure of beaches in Dublin in 2005 because of the Lion's Mane jellyfish, may suggest that this is true. However, at present there is insufficient data to support this view.

## Jellyfish as food

Living on a diet of jellyfish may not seem like a clever thing to do as they have few nutrients and are full of venom! Yet many marine animals feed entirely on jellyfish. The Leatherback sea turtle swims all the way from the Caribbean and west coast of Africa to feed on Ireland's abundant supply of jellyfish! It is not entirely clear how such large animals (they are the size of a cow) can survive on a diet of jellyfish? One thing is for sure; they have to eat an awful lot of jellyfish, maybe as much as 100 kg a day! Another animal that feasts on jellyfish is the ocean sunfish. Sunfish have a really weird shape and are sometimes called swimming heads. These animals are fascinating to watch, spending large amounts of time at the surface with their large dorsal fin flipping from side to side. Every summer they can be observed in Irish coastal waters feeding on jellyfish.

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