

# Preface

Whether you are a world traveller, an outdoor adventurer or a recreationist out for a day trip, you face an array of potential threats from invertebrates. We envision two primary uses for this work. It can serve as a traveller's reference to assess the threats that might be present in a region to which you might travel. It also can serve as guide for medical professionals, and lay public to make preliminary assessments as to whether or not a particular invertebrate attack poses any threats, and how to mitigate those threats. This book does not deal with helminth worms and other internal parasites because doing so would make this work impractically large. We also do not attempt to cover the full range of control or management options for invertebrate pests because that is a vast topic in its own right and beyond the scope of this book.

This guide presents a basic yet sound understanding of potentially dangerous invertebrates that travellers and adventures may encounter. Our intent is not to provide a definitive or exhaustive description of every species, but instead we briefly discuss biological, physical and behavioural characteristics of key groups in an attempt to give the reader a better direction on identity. We have attempted to show in photographs the appearance of the animals we discuss, but we recognise that the range of variation seen in nature may not be entirely reflected in the photos we present. Distributional maps are presented

only as general information and are not intended to be specific range boundaries.

This guide considers only animals posing a direct contact threat, not toxic food reactions, contact allergies or poisonous animals that must be consumed. In addition, a few other invertebrates are included because they are often incorrectly presumed dangerous. We reviewed and consolidated the exhaustive literature available, but, to make it concise, individual information sources are not cited in the text. We do list selected reliable resources and references should the reader be interested in learning more about the animals described.

To make the guide easy to use while 'on the go', we streamlined the text and used common language to describe the invertebrates and their associated reaction symptoms. In some situations, we used medical and technical terms for brevity or to avoid confusion. Similarly, many invertebrates are commonly called different names, depending on location. We include those common names, but associate them and all other information with their presently accepted scientific name and associated higher taxonomic nomenclature (phylum, class, order, family, genus). This will assist you to find additional information on those species or groups.

Most medical treatments included in this book involve only basic first-aid procedures, although some responses may involve complex medial intervention. Treatment

guidelines, when presented, are based on information available when this guide was written. Travellers/adventurers and medical-care providers should consult the most

current, reliable information available to ensure correct treatment regimens. Medical practitioners are solely responsible for medications, dosages and therapies prescribed.

# Coelenterates

## (Phylum Cnidaria: jellyfish, sea anemones, sea fans, corals)

Over 9000 coelenterate species inhabit mostly marine systems worldwide including free-swimming true jellyfish medusae and fixed forms such as corals, sea ferns and sea anemones. A few medically unimportant species are freshwater forms. You may encounter beaches displaying cnidarian warning signs because many can produce painful and dangerous stings. Some jellyfish are extremely dangerous and are capable of killing you.

Coelenterates are among the most primitive carnivorous animals. Despite their simple and delicate body forms, they have developed sophisticated envenomation mechanisms called nematocysts. Nematocysts are cellular capsules containing a coiled, barbed tube (see diagram). When activated, this barbed tube pene-

trates you, injecting venom. A single cnidarian can have millions of nematocysts.

### Jellyfish

#### (Subphylum Medusozoa)

There are over 2000 described jellyfish species but only ~70 can cause serious injury. The common and widely distributed moon jellyfish (*Aurelia aurita*) is generally considered harmless. However, it occasionally stings people, particularly in the Gulf of Mexico. Such encounters are more likely near coastal areas where populations are greater. Stings cause instant localised pain lasting up to 30 minutes. Hives and inflammation may appear around the wound shortly after envenomation followed by ulceration. Residual pain

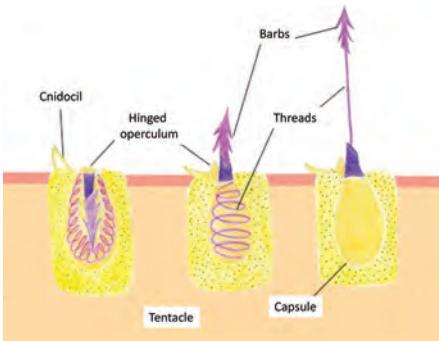


Diagram of a coelenterate nematocyst showing the discharge mechanism. Source: Redrawn from Spaully/Wikipedia. Available from [https://en.wikipedia.org/wiki/Cnidocyte#/media/File:Nematocyst\\_discharge.png](https://en.wikipedia.org/wiki/Cnidocyte#/media/File:Nematocyst_discharge.png)



Moon jellyfish (*Aurelia aurita*) at Gota Sagher (Red Sea, Egypt). Source: Alexander Vasenin/Wikipedia, CC BY-SA 3.0.0. Available from [https://en.wikipedia.org/wiki/Aurelia\\_aurita#/media/File:Moon\\_jellyfish\\_at\\_Gota\\_Sagher.jpg](https://en.wikipedia.org/wiki/Aurelia_aurita#/media/File:Moon_jellyfish_at_Gota_Sagher.jpg)



Distribution of moon jellyfish (*Aurelia aurita*).

may last several days. Encrusted lesions become obvious in a few days and post-inflammatory, darkly pigmented skin may last up to 2 weeks.

Another common and widely distributed jellyfish, the East coast sea nettle (*Chrysaora quinquecirrha*) occurs in the Atlantic Ocean from Cape Cod south along the United States eastern coast into the Caribbean and Gulf of Mexico, and in portions of the Indo-Pacific Ocean. It was also introduced to the Black Sea in Europe. It is commonly found near the confluence of coastal tributaries and bays with 10 to 20 ppt salinities. It is generally white in colour, but can have prominent maroon-coloured markings in some areas. East coast sea nettle stings, while painful, are not considered deadly.

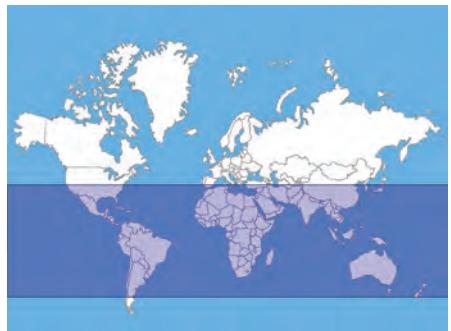
A related species, the West coast sea nettle (*Chrysaora fuscescens*) has an equally painful sting. It ranges from British Columbia to Mexico although it is most commonly found in the northern and eastern Pacific Ocean. It often forms massive swarms with nearshore aggregations most common during autumn (fall) and winter months. West coast sea nettles have a distinctive golden-brown bell (up to



East coast sea nettle (*Chrysaora quinquecirrha*). Specimen appears orange due to lighting. Source: Antoine Taveneaux/Wikipedia, CC BY-SA 3.0.0. Available from [https://en.wikipedia.org/wiki/Chrysaora\\_quinquecirrha#/media/File:Chrysaora\\_quinquecirrha.jpg](https://en.wikipedia.org/wiki/Chrysaora_quinquecirrha#/media/File:Chrysaora_quinquecirrha.jpg)

30 cm diameter) with whitish oral arms. Thin maroon tentacles may trail behind several metres.

Various, potentially dangerous, box jellyfish occur in warmer oceans worldwide,



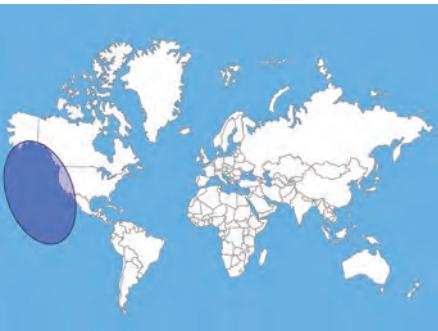
Distribution of East coast sea nettle (*Chrysaora quinquecirrha*).



West coast Sea nettle (*Chrysaora fuscescens*). Source: Ed Bierman/Wikipedia, CC BY 2.0. Available from [https://en.wikipedia.org/wiki/Chrysaora\\_fuscescens#/media/File:Sea\\_nettle\\_\(Chrysaora\\_fuscescens\)\\_2.jpg](https://en.wikipedia.org/wiki/Chrysaora_fuscescens#/media/File:Sea_nettle_(Chrysaora_fuscescens)_2.jpg)

but the box jellyfish or sea wasp (*Chironex fleckeri*) is considered among the most dangerous marine animals in the world (if not the most dangerous). It has been implicated in over 70 deaths throughout its Indo-Pacific Ocean distribution (primarily around Australia). Some consider it the most venomous creature on the planet.

Children are particularly vulnerable. Most stings occur on humid days when the water is calm. November to May is generally considered unsafe for swimming in nearshore tropical Pacific waters due to



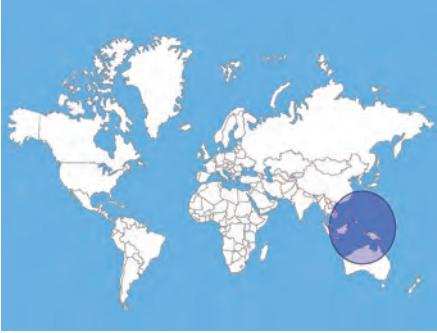
Distribution of West coast Sea nettle (*Chrysaora fuscescens*).



Box jellyfish (*Chironex fleckeri*). Source: Guido Gautsch/Wikipedia, CC BY-SA2.0. Available from [https://en.wikipedia.org/wiki/Chironex\\_fleckeri#/media/File:Avispa\\_marina\\_cropped.png](https://en.wikipedia.org/wiki/Chironex_fleckeri#/media/File:Avispa_marina_cropped.png)

this jellyfish in addition to the highly dangerous Irukandji (see later). *Chironex* prefer calm waters within 2 km (1.2 miles) of the shore and tend to congregate near estuaries. They are rarely found in open waters. On windy days, they drift below the choppy surface to calmer, deeper waters where unsuspecting swimmers encounter them. Despite claims to the contrary, sting netting used as a deterrent is not 100% effective because stings occur each year within so called ‘safe swimming’ enclosures.

*Chironex* stings are severely painful, peaking in 15 minutes but persisting up to 12 hours. Immediate rapid heartbeat and high blood pressure are superseded by an unusually slow heartbeat with inadequate blood flow causing shock, other heart anomalies and pulmonary oedema. Also, neuromuscular paralysis may lead to respiratory arrest. Within minutes, loss of con-



Distribution of box jellyfish (*Chironex fleckeri*).

sciousness and death may rapidly ensue. The sting pattern is characteristically visible as a frosty appearing whiplash, beaded, or a ladder pattern of red, purple or brown skin lesions. Among survivors, these develop over several days into ulcers and widespread tissue necrosis. They slowly heal over several months but often with significant residual pigmentation and scarring.

First aid for box jellyfish and Irukandji must commence as soon as possible. Treatment is mainly supportive. The traditional remedy of liberally pouring vinegar over the wound to inactivate the nematocysts may have little value and provides minimal relief at best. Several other substances such

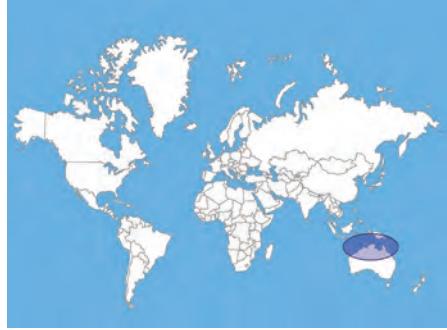


Jellyfish sting. Source: Thomas Quine/Flickr. CC BY 2.0. Available from <https://www.flickr.com/photos/quinet/6052293114/>

as freshwater, alcohol, tea, urine, cola drinks and aluminium sulfate (Stingose®), also are not effective and may activate undischarged nematocysts. Similarly, there is no evidence that compression bandages and limb immobilisation modify the subsequent clinical course. Cautiously, manually remove adhering tentacles to prevent further stinging to victim and yourself. Basic life support measures, including cardiopulmonary resuscitation (CPR) and hospitalisation may be required. Pain suppressants are often administered during transport to hospital. Treat irregular heartbeat with appropriate agents and pain control generally requires large intravenous narcotic analgesic doses. Several treatments with morphine or opiates may be required before the pain subsides. In the most serious cases, an extremely dangerous sympathomimetic syndrome may develop with a broad suite of characteristic symptoms including delusions, paranoia, rapid or slow heartbeat, irregular heartbeat, high or low blood pressure, high fever, sweating, bristling of hairs, dilated pupils, overactive physiological responses and seizures. This condition requires immediate emergency medical care involving advanced life support measures such as respiratory ventilation with continuous positive pressure airway or tracheal intubation. Treat skin and tissue lesions conventionally, but they may eventually require surgical debridement and grafting.

*Carukia barnesi* and *Malo kingi*, commonly known as Irukandji (an Aboriginal tribal name) or Kingslayer in Australia are small species of box jellyfish that are widely distributed in open and coastal waters of the southern Pacific. A few other species of *Malo* are distributed in the greater

Indo-Pacific Ocean and they also may be capable of inflicting dangerous stings. The bell of these small jellyfish is only ~20 mm (0.78 inch) wide with four long tentacles up to a metre long. The clinical presentation following a sting is known as the Irukandji syndrome, which can be severe, although generally not fatal when properly treated. The initial stinging sensation diminishes after a few minutes and you may not notice it. Subsequent localised development of limb pain is variable but occasionally quite severe. The sting area becomes reddened with small, gooseflesh-like lesions. An associated dry skin reaction may develop followed by excessive localised sweating. After 30 to 40 minutes following the sting, systemic symptoms usually commence, which may last 4 to 96 hours, but typically over 12. These are predominantly widespread pain (especially in the abdomen, large muscle groups, back and joints) often with severe headache. High blood pressure, rapid and irregular heartbeat, sweating, agitation, nausea and vomiting may also develop. As with box jellyfish, a sympathomimetic syndrome may develop. In severe cases, symptoms may progress to low blood pressure, pulmonary oedema, shock and



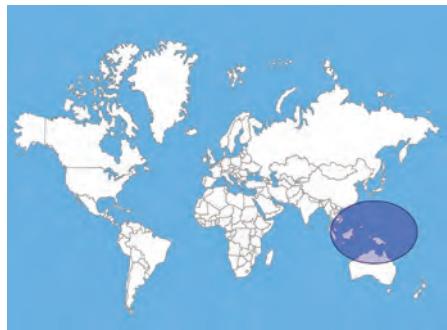
Distribution of Irukandji (*Carukia barnesi*).

heart failure. Heart attacks, even in the absence of recognised risk factors, may occur. Other stinging box jellyfish, in the same family as *Carukia* and *Malo*, have similar symptoms. They include several species in the genus *Carybdea* found throughout the southern Pacific Ocean.

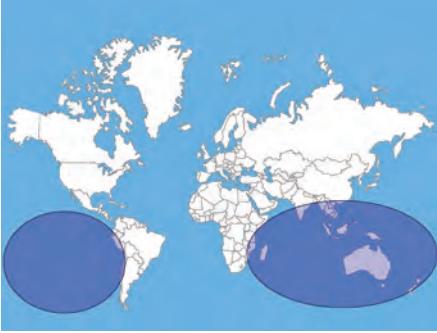
The Indo-Pacific jellyfish, *Chiropsalmus quadrigatus*, is also commonly known as the box jellyfish but should not be confused with *Chironex fleckeri*. Therefore, to avoid confusion we use the common name false box jellyfish here. There is little specific information available for this species, but it is implicated in many serious stinging attacks and at least one death. A related species, *Chiropsalmus quadrumanus* (sea wasp), is a common jel-



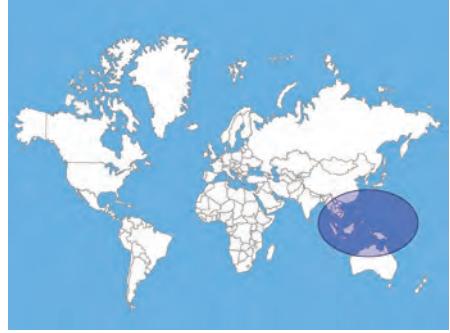
Box jellyfish (*Carybdea branchi*). Seascapeza/Wikipedia. CC BY-SA 3.0. Available from [https://en.wikipedia.org/wiki/Carybdea\\_branchi#/media/File:Carybdea\\_branchi9.jpg](https://en.wikipedia.org/wiki/Carybdea_branchi#/media/File:Carybdea_branchi9.jpg)



Distribution of Kingslayer (*Malo* spp.).



Distribution of box jellyfish (*Carybdea* spp.).



Distribution of False box jellyfish (*Chiropsalmus quadrigatus*).

lyfish in the western Atlantic Ocean and Gulf of Mexico and it has a potent sting.

The pink jellyfish, *Pelagia noctiluca*, is distributed in oceans worldwide appearing in abundance about every 10 to 12 years. During these cyclic proliferations, medusae swarms congregate near beaches with sig-

nificant envenomations. The stings usually produce minor cutaneous reactions such as reddened, inflamed and itchy eruptions, but some produce more dramatic lesions with some presenting as a burn-like response. A post inflammatory pigmentation may last several months, but this condition eventually resolves spontaneously.

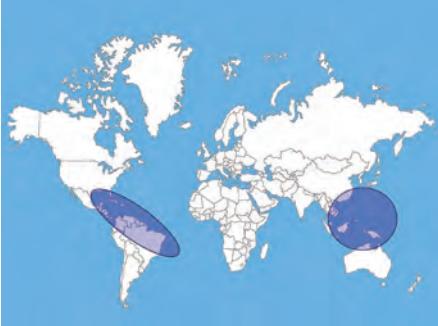
The thimble jellyfish, *Linuche unguiculata*, ('sea lice') is a small, ~20 mm (0.78 inch) in diameter, species with a distinctive



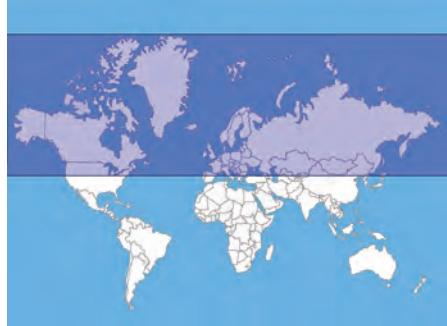
False box jellyfish (*Chiropsalmus quadrigatus*). Source: OpenCage/Wikipedia. CC BY-SA 2.5. Available from [https://commons.wikimedia.org/wiki/File:Chiropsalmus\\_quadrigatus.jpg](https://commons.wikimedia.org/wiki/File:Chiropsalmus_quadrigatus.jpg)



Pink Jellyfish (*Pelagia noctiluca*). Source: Alberto Romeo/Wikipedia, CC BY 3.0. Available from [https://en.wikipedia.org/wiki/Pelagia\\_noctiluca#/media/File:Capo\\_Gallo\\_Pelagia\\_noctiluca.jpg](https://en.wikipedia.org/wiki/Pelagia_noctiluca#/media/File:Capo_Gallo_Pelagia_noctiluca.jpg)



Distribution of Thimble jellyfish (*Linuche unguiculata*).



Distribution of Lion's mane jellyfish (*Cyanea capillata*).

dark brown internal appearance. They are widely distributed throughout the Caribbean and Gulf of Mexico and Indo-Pacific Ocean, breeding throughout the summer with populations usually peaking in May. They often form swarms of several thousand individuals, although isolated individuals are occasionally seen. Mild irritation follows an initial sting from this species. The site develops into an itchy, reddened rash within a few days known as seabather's eruption. Symptoms generally self-resolve, and antihistamines can reduce itching.

The lion's mane jellyfish, *Cyanea capillata*, is up to 2 m (6.5 feet) in diameter with long stinging tentacles and is distributed in

cold boreal waters of the northern Atlantic and northern Pacific oceans and Arctic Sea. Their powerfully painful sting causes severe burning and blistering. Prolonged stinging events can cause muscle cramps, respiratory distress and, in some cases, death.

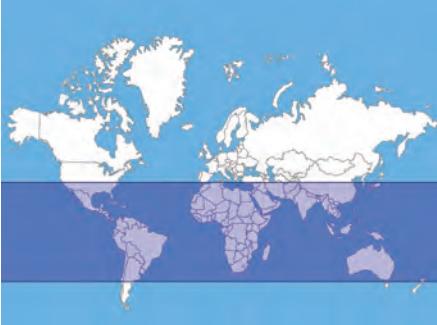
Portuguese man o'war (*Physalia physalis*) is a large jellyfish with up to 10 m (33 feet) long tentacles. It has a widespread distribution in mostly subtropical waters of the Atlantic, Pacific and Indian Oceans. Their large bluish gas filled sac (pneumatophore) moves them through the water similar to a sail, often towards shore. Man-o-war stings can be extremely painful and debilitating. Lesions and welts at the sting site are common. A red line develops with



Lion's mane jellyfish (*Cyanea capillata*). Source: Tim Gage/Flickr. CC BY-SA 2.0. Available from [https://www.flickr.com/photos/timg\\_vancouver/9685088002/](https://www.flickr.com/photos/timg_vancouver/9685088002/)



Portuguese Man o'war (*Physalia physalis*). Source: NOAA



Distribution of Portuguese Man o' war (*Physalia physalis*).

white lesions that may resemble a ladder-like pattern, and small wheals may develop resembling a string of beads. Most lesions dissipate within a few hours, but affected skin may remain reddened for about a day. Symptoms are highly variable, ranging from mild irritation and rashes to severe pain, systemic shock, and even death from respiratory failure. Persistent dull pain, often in the joints, follows the initial pain. A systemic syndrome lasting up to 24 hours may ensue with general discomfort, muscle cramps, headache, abdominal pain, chills, fever, nausea, vomiting, diarrhoea, hypotension (sometimes shock), nervousness, irritability, hysteria, confusion, abnormally fast heartbeat and cyanosis. This may require hospitalisation and possibly intensive care depending on systemic syndrome severity. Treatment is mainly supportive but may require advanced life support measures. Local corticosteroid creams may reduce inflammation.

### Sea anemones (Class Anthozoa)

An estimated 1000 sea anemone species occur in oceans globally. Fortunately, most sea anemones have weak nematocysts that

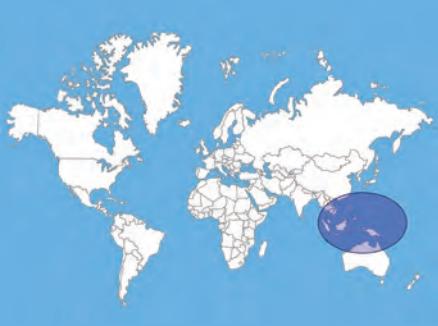


Balloon corallimorph (*Amplexideiscus fenestrafer*). Source: Ahmed Abdul Rahman/Wikipedia. CC BY-SA 4.0. Available from [https://en.wikipedia.org/wiki/Corallimorpharia#/media/File:Amplexidiscus\\_fenestrafer\\_Maldives.JPG](https://en.wikipedia.org/wiki/Corallimorpharia#/media/File:Amplexidiscus_fenestrafer_Maldives.JPG)

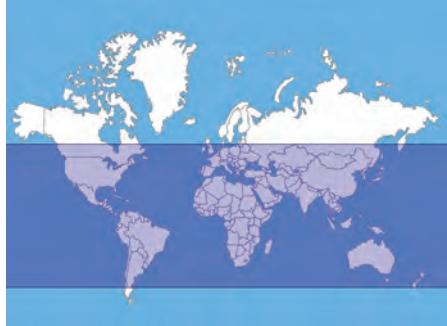
cannot penetrate human skin. However, some have dangerous, painful incapacitating stings. The balloon corallimorph (*Amplexideiscus fenestrafer*) is a colonial mushroom anemone distributed in the western Indo-Pacific Ocean. Its stinging tentacles can penetrate wetsuits causing significant pain. Initial symptoms vary from a prickly sensation to severe pain. The afflicted area can become red, swollen and blistered. The more dangerous anemones can cause shock and respiratory distress. Long-term neurological damage may occur. Treatment is the same as described earlier for jellyfish.



Unidentified sea anemone. Source: Bernard Spragg/Flickr. Public domain. CCO 1.0. Available from <https://www.flickr.com/photos/volvob12b/14231557292/>



Distribution of Balloon corallimorph (*Amplexideiscus fenestrafer*).



Distribution of Stinging sea ferns (*Aglaophenia* spp.).

**Sea ferns**  
(Class Hydrozoa)

A few sessile, colonial hydroids can inflict dangerous stings, including the cypress sea fern, *Aglaophenia cupressina*, and white-stinging sea fern, *Aglaophenia philippina*, found in the central and southern Pacific Ocean. There are over 80 species assigned to this genus and it is possible that some of the other species may also be able to sting people. The slightest brush against their deceptively delicate fronds causes immediate pain. Each limb has rows of tiny nematocyst filled polyps. Stings begin as a patchy reddened area. Wheals may develop within 30 minutes and may take up to a month to heal. Effective pain relief can be obtained with a local anaesthetic ointment.



Stinging sea fern (*Aglaophenia cupressina*). Source: Bernard DuPont/Flickr. CC BY-SA 2.0. Available from <https://www.flickr.com/photos/berniedup/8475698815/>

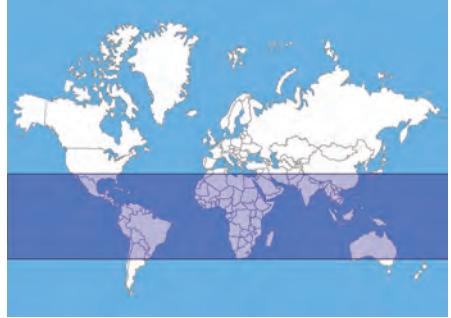
**Corals**  
(Class Anthozoa)

Corals are a diverse group (over 2500 species) of sessile marine colonial coelenterates. About 1000 species secrete very sharp calcareous, rock-like shelters. These accumulate over time to create islands and atolls such as those on Australia's Great Barrier Reefs. They pose two potential threats: (1) both dead and living corals can produce serious cuts and scrapes, and (2) some living corals can inflict painful and potentially dangerous stings. About a dozen species of fire corals (*Millepora* spp.) are particularly noteworthy. They are commonly found in warm oceans



Branching fire coral (*Millepora dichotoma*). Source: Tim Sheerman-Chase/Flickr. CC BY 2.0. Available from [https://www.flickr.com/photos/tim\\_uk/10066860775/](https://www.flickr.com/photos/tim_uk/10066860775/)

worldwide. Stings burn and generally produce patchy, reddened, inflamed skin at the site of contact. Local anaesthetic ointment effectively relieves pain, but severe cases may require additional medical treatment. Corals are especially dangerous in the tropical Pacific Ocean. Coral danger signs posted on beaches should be heeded, and swimmers should take precautions to avoid accidental contact.



Distribution of Fire coral (*Millepora* spp.).