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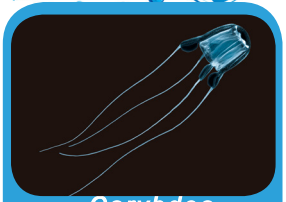
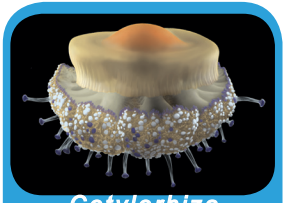
Identification guide and stinging treatment for jellyfish and other gelatinous organisms

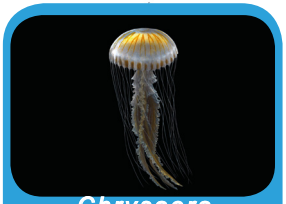

Carybdea marsupialis


Pelagia noctiluca

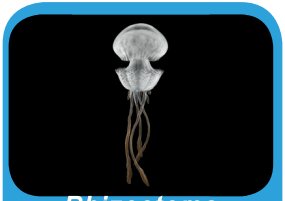

Rhizostoma pulmo


Cotylorhiza tuberculata


Aurelia sp.


Chrysaora hysoscella

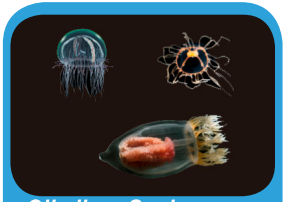

Discomedusa lobata


Rhizostoma luteum

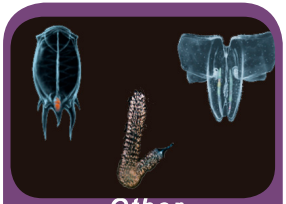

Aequorea forskalea

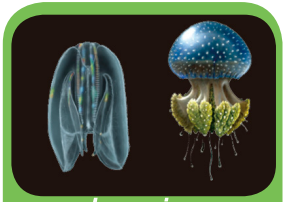

Velella velella

Porpita porpita


Olindias, Gonionemus, Pandea


Physalia physalis


Other gelatinous


Invasive species


Other jellyfish of the Mediterranean

Technical card of Jellyfish

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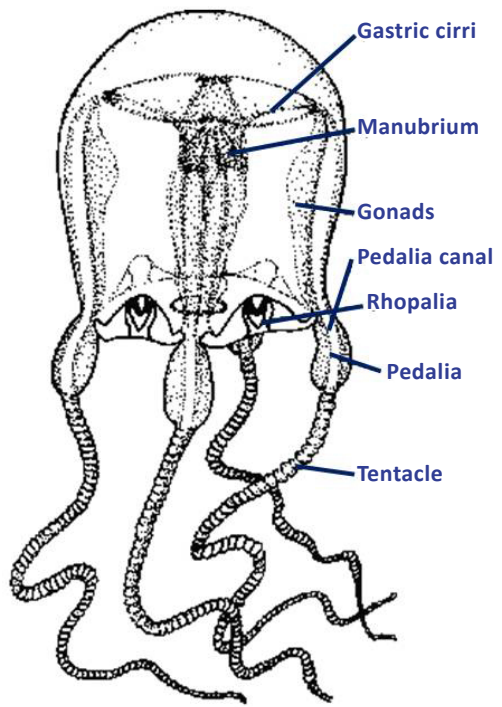
Cnidarians are a group of animals that include jellyfish and other stinging gelatinous organisms, which have specific cells called cnidocists that are like microsyringes that inject toxic substances used for feeding and defence. Cnidocists are distributed over the whole body of the jellyfish, but are concentrated in the tentacles. The level of toxicity for humans is different depending on the jellyfish species. The majority of accidental contacts between humans and jellyfish occur during bathing or with dead animals or with their tentacles in the beach. The toxic capacity remains for a long time after the jellyfish dies.

In this guide, jellyfish are classified according to the species-specific stinging capacity in the following categories:

- HIGH STINGING
- STINGING
- MILD STINGING
- HARMLESS

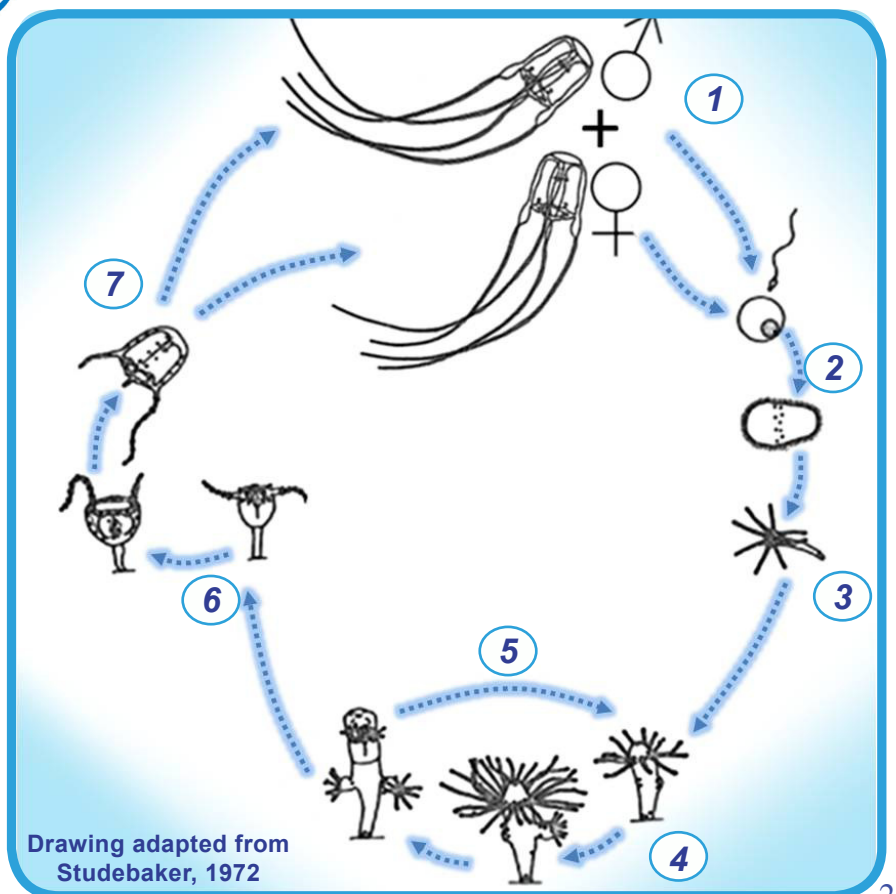
General diagram of a box jellyfish



Jellyfish Life Cycle

Jellyfish present different life cycles depending on the species. The one presented in this guide is the one that corresponds to cubozoans.

1. *Male and female mating*
2. *Released of fertilized egg into the water column*
3. *Settlement of planulae larva on substrate after ~2 days*
4. *Benthic polyp phase*
5. *New polyps budding from existing polyps*
6. *Polyp metamorphosing into juvenile medusa*
7. *Release of juvenile cubomedusa*



Drawing adapted from Studebaker, 1972

Jellyfish that may occur in the Spanish Mediterranean coast

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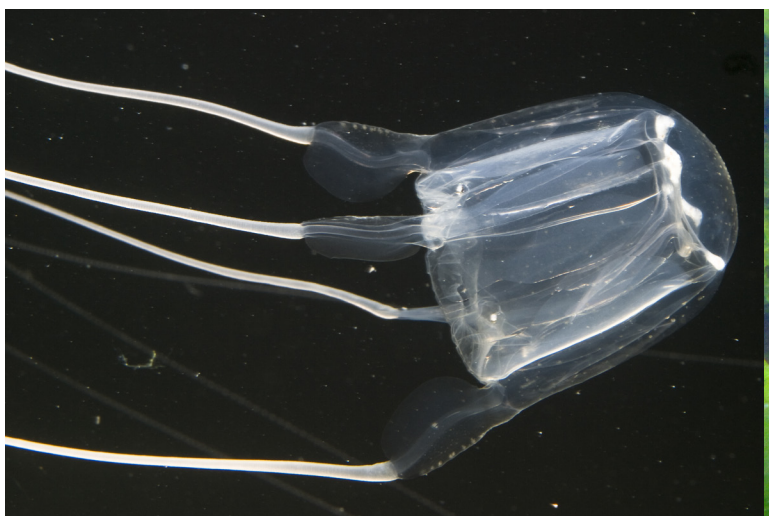
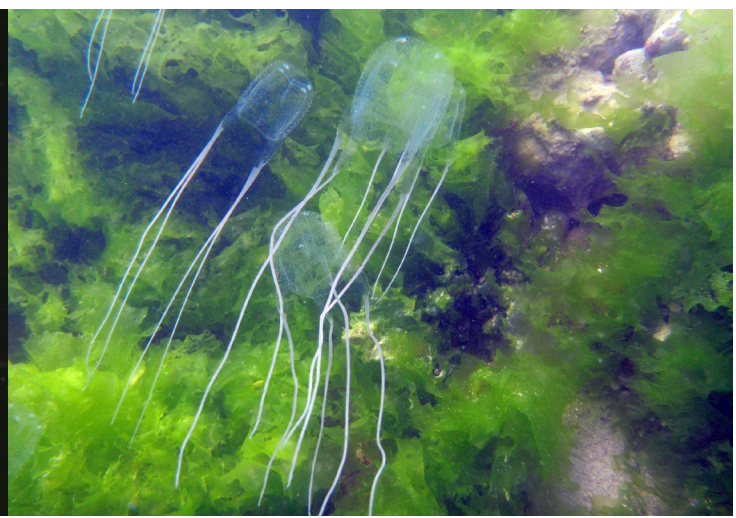
Carybdea marsupialis

Common name: Box jellyfish

Umbrella up to 5 cm





Cube-shaped umbrella with 4 long tentacles. Transparent bluish or whitish colour. Inhabit very shallow waters.

HIGH STINGING

FREQUENT
Summer - Autumn

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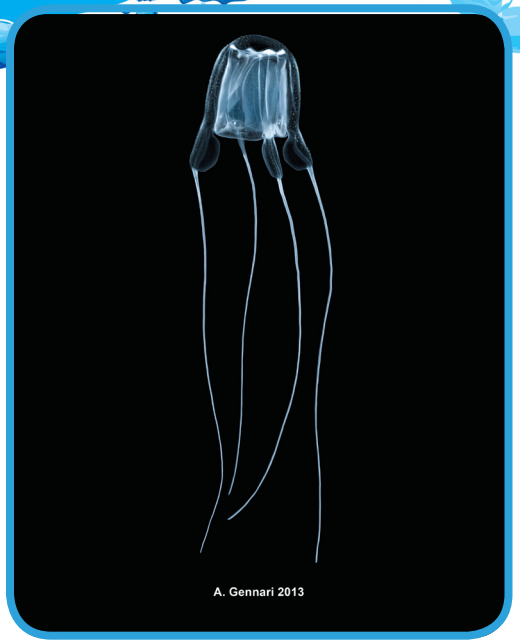

Carybdea marsupialis

C. marsupialis is a box jellyfish, but its venom is not lethal. The preferred environment for this species seems to be the sandy substrate, and it swims over the bottom during the day moving to the surface during the night. Its presence in certain areas of the Spanish Mediterranean coast is very abundant.

Jellyfish that may occur in the Spanish Mediterranean coast

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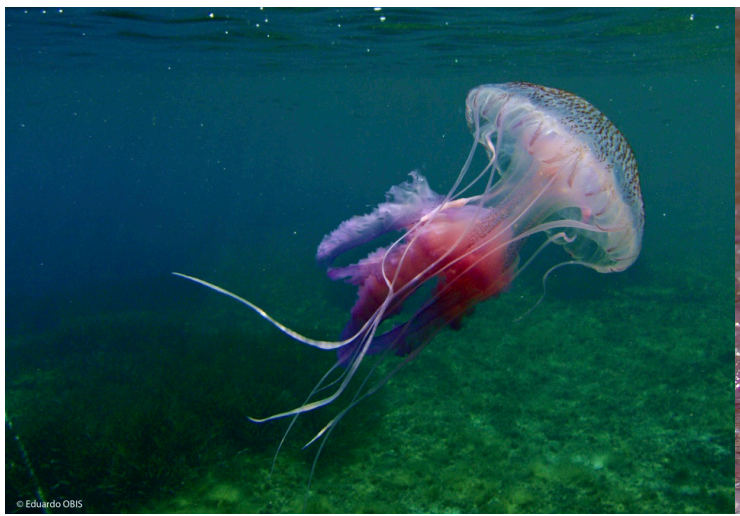
Pelagia noctiluca

Common name: Mauve stinger **Umbrella diameter up to 20 cm**



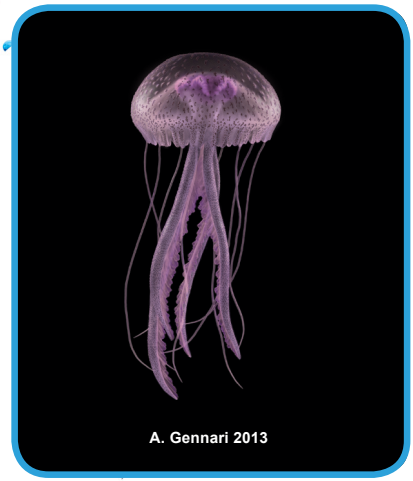
Pink-red colour. Hemispheric umbrella with 4 thick oral arms and 8 marginal tentacles (up to 2 m length). The surface of the umbrella is covered with brownish warts. Juveniles may be light brown colour instead of pink.

HIGH STINGING

VERY FREQUENT
All-year round

cubomed
LIFE08 NAT ES 0064

Pelagia noctiluca



This species is considered one of the most abundant and important in the western Mediterranean.
It is an oceanic species and its life cycle is completely pelagic (without a polyp stage). Its presence in coastal waters relies on environmental and climatological conditions. It is very frequent during spring and summer seasons, even though it can be present during the whole year.
It has bioluminescence and it is often accompanied by juvenile fishes from the Carangidae family.

Jellyfish that may occur in the Spanish Mediterranean coast

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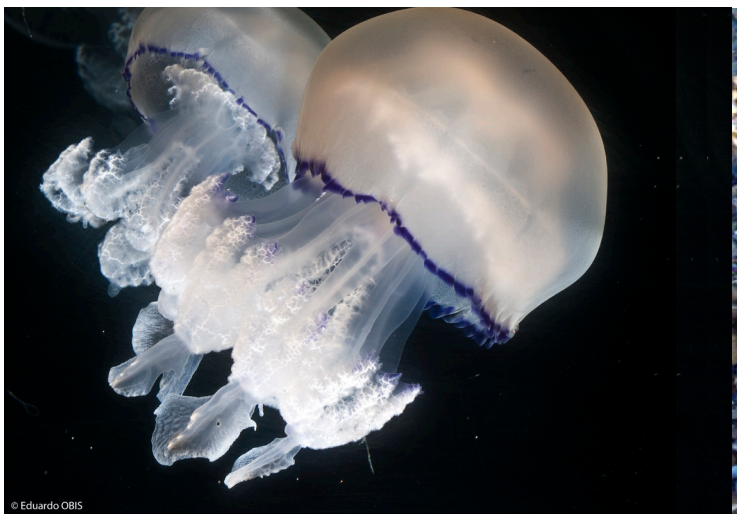
Rhizostoma pulmo

Common name: Barrel jellyfish **Umbrella diameter up to 40 cm**



Bell-shaped umbrella, white-bluish colour with a violet border. No marginal tentacles and 8 white-bluish and thick oral arms, fused together with no branching.

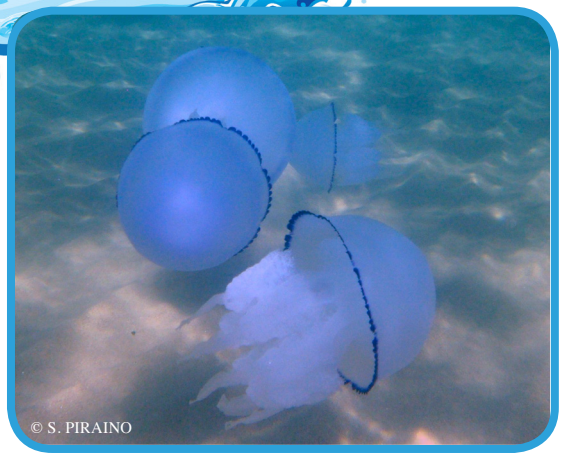
STINGING

VERY FREQUENT
Spring - Summer - Autumn

cubomed
LIFE08 NAT ES 0064

Rhizostoma pulmo

It is one of the biggest jellyfish along the Spanish Mediterranean coast. The small medusae are produced in spring and the larger adults are more evident in summer and at the beginning of autumn. It is considered a coastal species, generally present at or near the surface. It is usually accompanied by crabs and juveniles fishes from the Carangidae family.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Jellyfish that may occur in the Spanish Mediterranean coast

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Cotylorhiza tuberculata

Common name: Fried egg jellyfish **Umbrella diameter up to 35 cm**

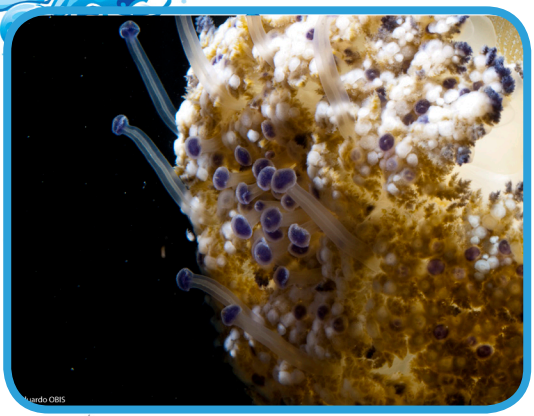
Flattened umbrella, brown-yellowish, with a large central protuberance in dark orange colour. Without marginal tentacles, 8 oral arms with 3 appendages at the end, button-shaped and white or blue in colour.

MILD STINGING

VERY FREQUENT
End of summer - Autumn

Cotylorhiza tuberculata

It is an endemic species of the Mediterranean, coastal and with preference for warmer waters. The adults are more abundant at the end of the summer and beginning of autumn. It is often accompanied by juvenile fishes from the Carangidae family.



Jellyfish that may occur in the Spanish Mediterranean coast

cubomed
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Aurelia sp.

Common name: Moon jellyfish **Umbrella diameter up to 25 cm**

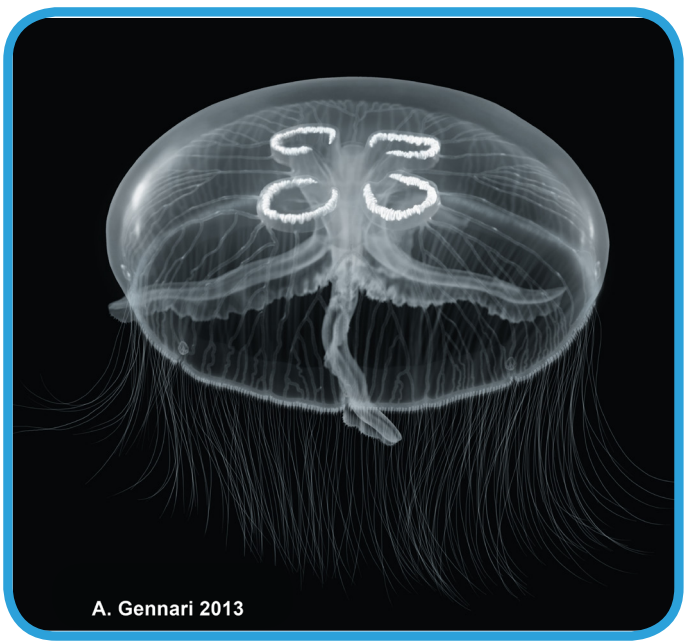
Plate-shaped umbrella. Transparent colour. Many short marginal tentacles and 4 long oral arms. Four horseshoe-shaped reproductive organs purple-violet in colour.

MILD STINGING

FREQUENT
Spring- Summer

cubomed
LIFE08 NAT ES 0064

Cosmopolitan species present in all the world's oceans. The frequency of this species in the Spanish Mediterranean had decreased in recent years. It is more frequent at the end of spring. It is a coastal species and it may be found even in estuaries and ports.



Aurelia sp.

Jellyfish that may occur in the Spanish Mediterranean coast

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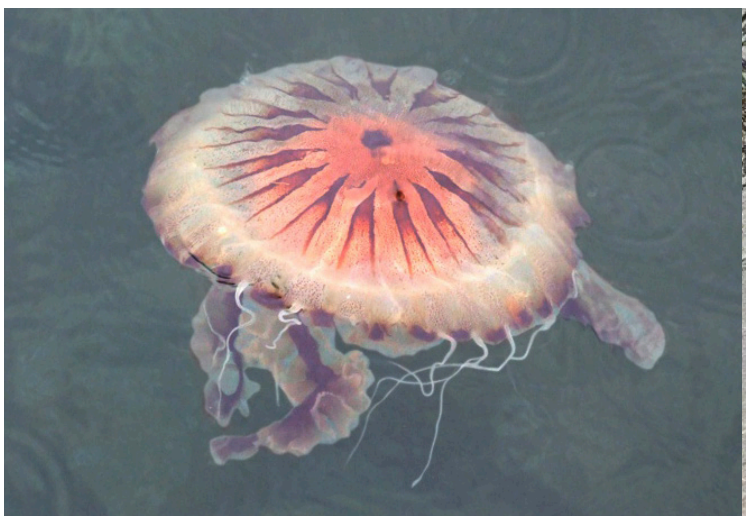
Chrysaora hysoscella

Common name: Compass jellyfish

Umbrella diameter up to 30 cm



White-yellowish umbrella, with 16 brown bands on the surface. It has 4 long oral arms and 24 long, thin marginal tentacles.

HIGH STINGING

LOW FREQUENCY
Spring

cubomed
LIFE08 NAT ES 0064

Chrysaora hysoscella

It is a pelagic rather big species. It may be quite abundant in some areas of the Spanish Mediterranean although it rarely forms swarms. It is commonly frequent in spring. It is often accompanied by juvenile fishes from the Carangidae family.

Jellyfish that may occur in the Spanish Mediterranean coast

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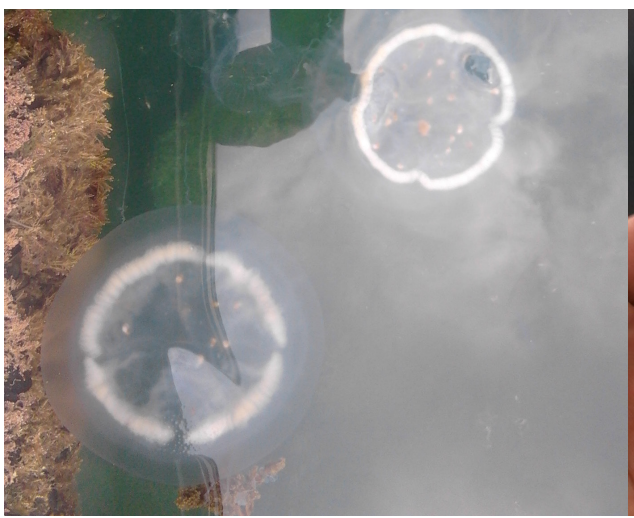
Discomedusa lobata

Common name: Discomedusa **Umbrella diameter up to 15 cm**



Flattened umbrella, transparent and with whitish colour gonads. It has 4 oral arms and 24 thin marginal tentacles. It is a rare species in the Mediterranean, but in 2013 it showed important abundances in some coastal areas.

MILD STINGING

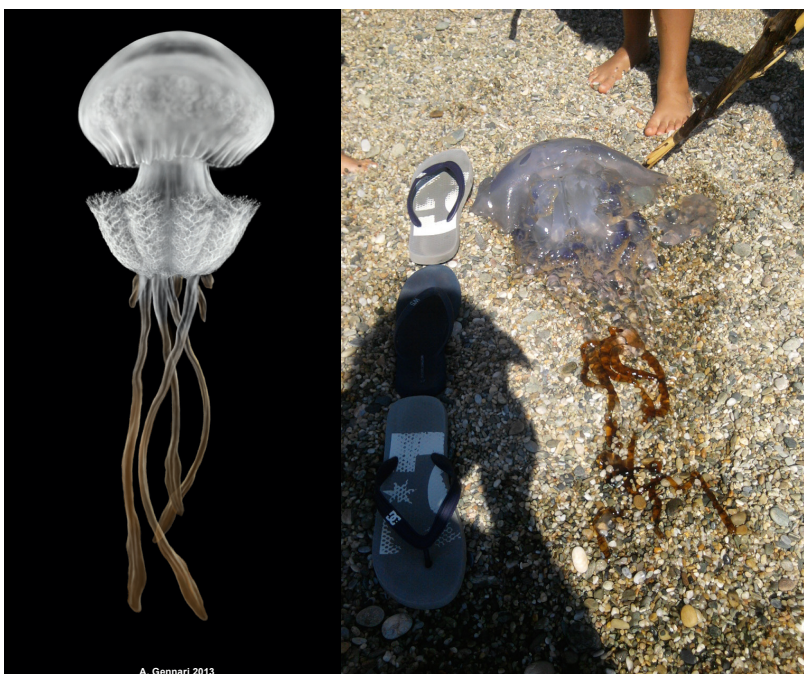
LOW FREQUENCY
Spring - Summer

Jellyfish that may occur in the Spanish Mediterranean coast

Rhizostoma luteum

Common name: does not have

Umbrella diameter up to 70 cm



Hemispheric umbrella without the characteristic violet border of the species *R. pulmo*. No marginal tentacles and 8 oral arms with a grey-black colouring in the distal part, that may extend even more than the individual's length. It may observed alone or forming swarms.
In the Mediterranean it had not been recorded since 1827, but in 2012 new records of this species were reported on the Spanish Mediterranean coast.

STINGING

VERY RARE
Spring - Summer - Autumn

Jellyfish that may occur in the Spanish Mediterranean coast

cubomed
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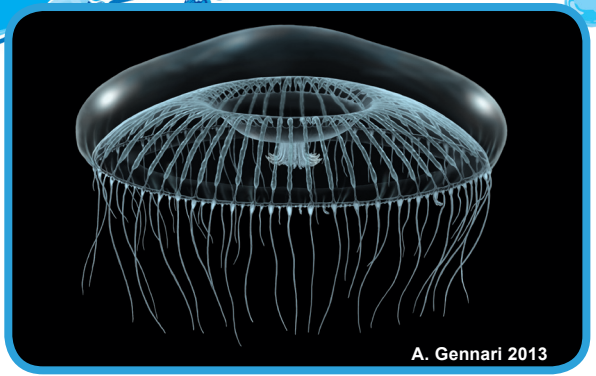
Aequorea forskalea

Common name: Crystal jelly **Umbrella diameter up to 25 cm**

Plate-shaped umbrella with a thicker centre. The umbrella is transparent with blue radial canals. Numerous, thin marginal tentacles and no oral arms.

MILD STINGING

FREQUENT
Spring



This species inhabits temperate to tropical waters, in coastal and littoral areas, occuring even occasionally in the open sea. It is a frequent species in the Spanish Mediterranean, being more common in spring and forming huge occasional swarms. It has bioluminescence and it is often accompanied by juvenile fishes from the Carangidae family.

Aequorea forskalea

Jellyfish that may occur in the Spanish Mediterranean coast

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Velella velella

Common name: Purple sailor **Disc diameter up to 8 cm**

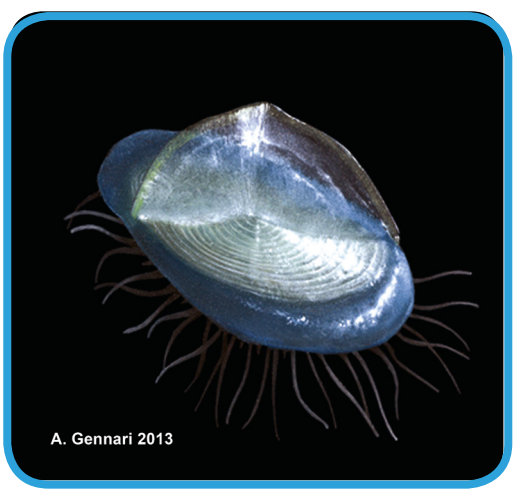
Blue oval disc with a small sail. It is a hydromedusa which life cycle phase usually observed is a floating polyp colony located underneath the skirt in form of tentacles. When alive, the edge is covered with a soft tissue.

MILD STINGING

FREQUENT
End of winter - Spring

Velella velella

It is a very frequent species in the Spanish Mediterranean especially during spring. It may be present in huge swarms reaching even several kilometres. The polyps of the colony produce small jellyfish that go deep in the sea where they reproduce sexually and produce small larvae that go to the surface and form new floating colonies.



Jellyfish that may occur in the Spanish Mediterranean coast

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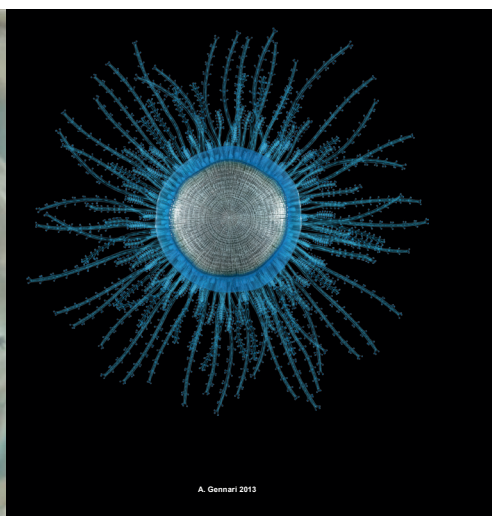
Porpita porpita

Common name: Blue button jelly

Disc diameter up to 5 cm



Small hydromedusa of intense blue colour. Colonial organism that lives at the surface of the open sea, but may be found in high number in coastal areas. It is seen occasionally in the Mediterranean Sea.

MILD STINGING

VERY RARE
Spring

Jellyfish that may occur in the Spanish Mediterranean coast

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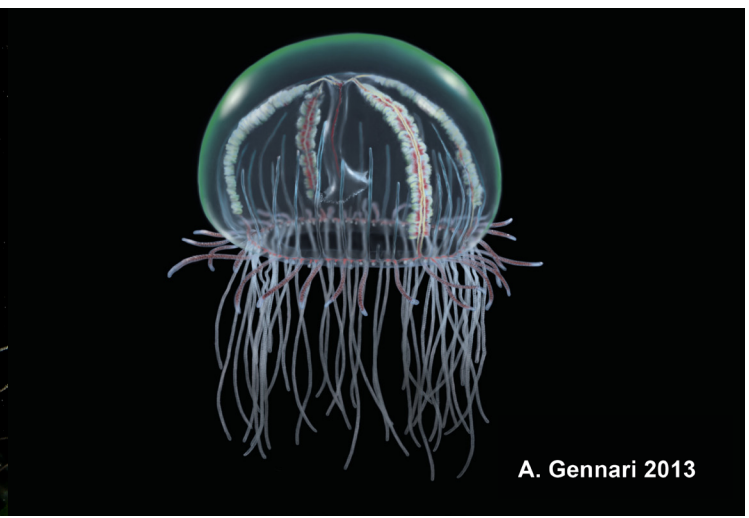
Olindias phosphorica

Common name: Cigar jellyfish **Umbrella diameter up to 8 cm**



Transparent hydromedusa with 4 radial opaque white stripes. The umbrella is surrounded by blue or dark red small tentacles. In the Spanish Mediterranean coast no large swarms are usually observed, but it may be very abundant locally.

HIGH STINGING

LOW FREQUENCY
Summer - Autumn

Jellyfish that may occur in the Spanish Mediterranean coast

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Gonionemus vertens

Common name: Orange striped jellyfish **Umbrella diameter 2 - 4 cm**

Transparent umbrella with orange gonads. Numerous tentacles, up to 90, with suckers at the ends; thus, it is frequent to find it attached to sea algae. It is s common species in the Mediterranean.

HIGH STINGING

FREQUENT
Spring - Summer

cubomed
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Jellyfish that may occur in the Spanish Mediterranean coast

Pandea conica

Common name: does not have

Length up to 6 cm

Hydromedusa with large tentacles used to capture gelatinous prey. The reddish gonads may be seen through the umbrella. It is common in surface waters in spring. There are no stinging records known for this species.

MILD STINGING

FREQUENT
Spring

Other gelatinous organisms that may occur in the Spanish Mediterranean coast

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Physalia physalis

Common name: Portuguese man-of-war Floating part 30 cm long-10 cm wide

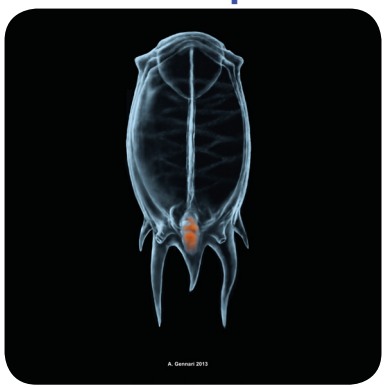
It is a floating colony with a gas-filled float. Opaque violet colour with a sail at the top. The immersed part has a long, thin, blue tentacles that may reach up to 20 m length. Native from the Atlantic Ocean.

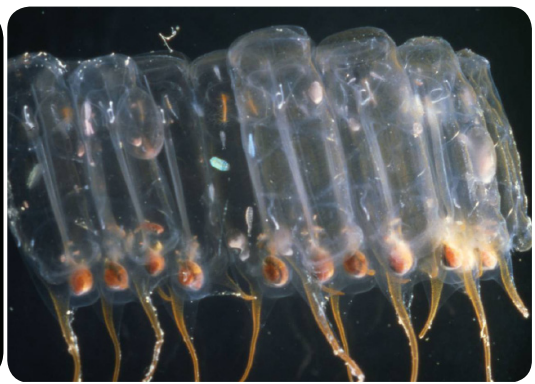
HIGH STINGING

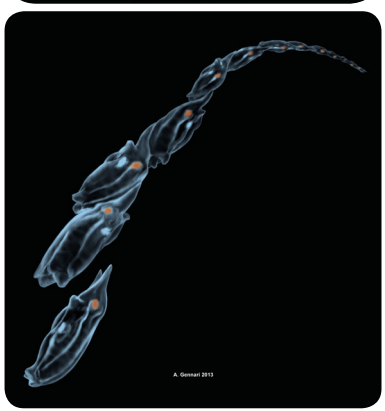
LOW FREQUENCY
Spring

Other gelatinous organisms that may occur in the Spanish Mediterranean coast

Salps

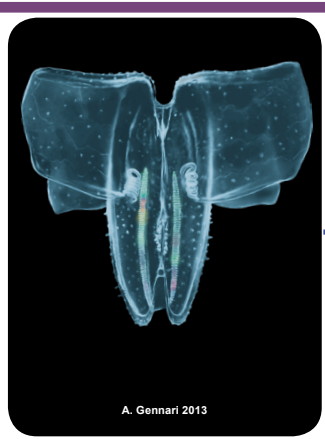






Gelatinous planktonic tunicates. Complex life cycle with solitary phases alternated with colonial phases. They form chains that may reach 7 or more metres length.

HARMLESS



Leuckotea multicornis
Ctenophore

Forskalia sp.
Siphonophore

Invasive species present on the Spanish Mediterranean coast

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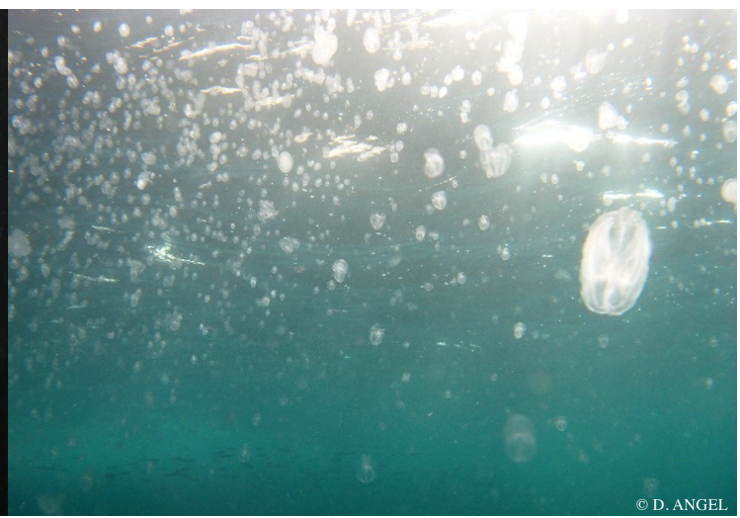
Mnemiopsis leidyi

Nombre común: Medusa bombilla **Longitud hasta 12 cm**



Invasive ctenophore native to the eastern Atlantic.
Bulb shape. Transparent. Adults have 8 ciliated lines and no tentacles. Organisms with iridescence and bioluminescence.

HARMLESS

FREQUENT
All-year round

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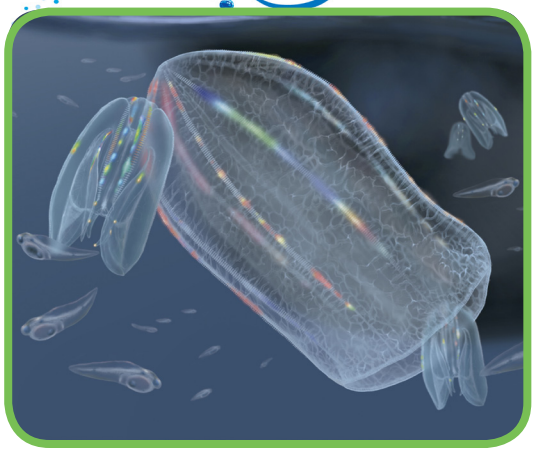
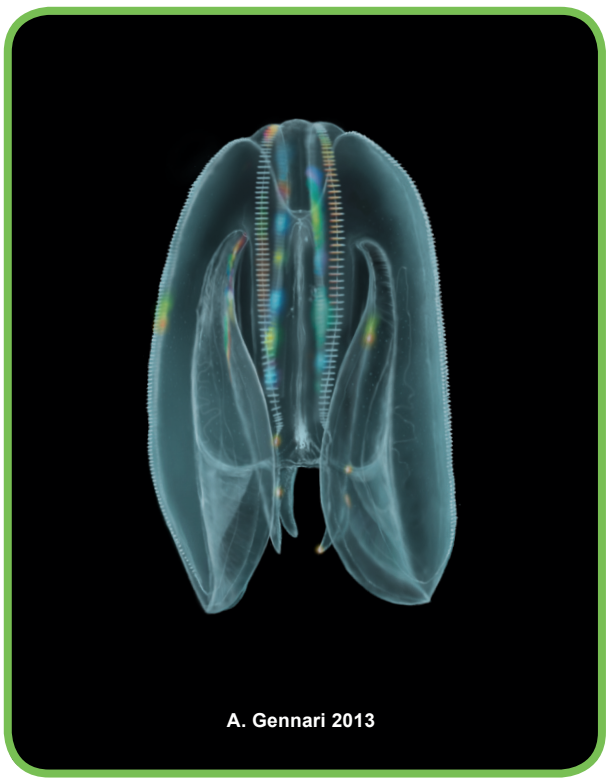
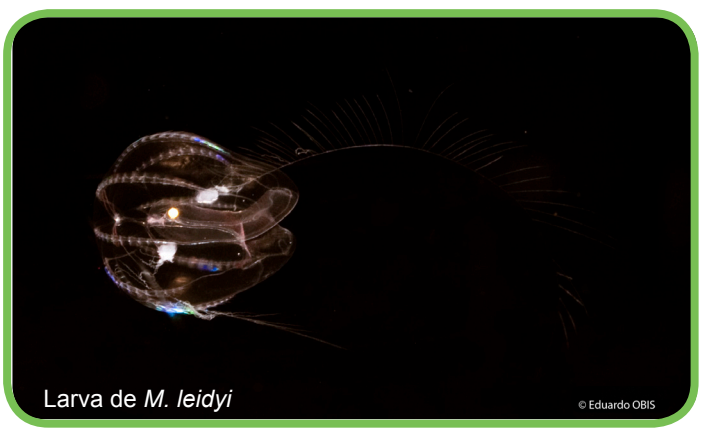
Mnemiopsis leidyi

The ctenophore *Beroe ovata*, native from the eastern Atlantic, is the specific natural predator of *M. leidyi*. It is an invasive species that occurs in some areas of the Mediterranean.



This invasive species is a ctenophore, thus it doesn't have cnidocists (stinging cells) and it is harmless to humans, but very detrimental for marine invaded ecosystems.





Invasive species present on the Spanish Mediterranean coast

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Phyllorhiza punctata

Common name: Australian spotted jelly **Umbrella diameter up to 70 cm**

Invasive jellyfish native from the Indo-Pacific. Hemispheric umbrella with white crystalline spots uniformly distributed. No marginal tentacles and 8 thick oral arms with 14 transparent appendages at the end.

MILD STINGING

LOW FREQUENCY
Spring - Summer - Autumn

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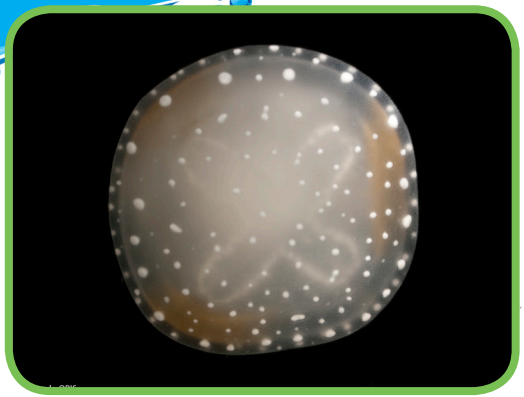
LIFE08 NAT ES 0064

Phyllorhiza punctata



This invasive species reached the Mediterranean through the Suez Canal and expanded to the whole basin. In the year 2010 was first described in the south of the Catalan coast in the Ebro Delta. It is a mild stinging jellyfish thus, it does not represent a problem to humans but it does for the marine ecosystems.

Medusas que se pueden encontrar en otros lugares del Mediterráneo

cubomed
LIFE08 NAT ES 0064

Pelagia benovici

New species. Recently (2014) described in the Mediterranean. Currently, no records for the Spanish Mediterranean coast.

HIGH STINGING

Drymonema dalmatinum

It is the biggest Mediterranean jellyfish and the least known of all. It has low frequency.

HIGH STINGING

Rhopilema nomadica

Introduced species. It is native from the Indo-Pacific. It is an established species in the eastern Mediterranean and dominates the pelagic ecosystems.

HIGH STINGING

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Medusas que se pueden encontrar en otros lugares del Mediterráneo

Cassiopea andromeda

Introduced species in the Mediterranean. Native from the Indo-Pacific. Currently it is present on some areas of the eastern Mediterranean.

MILD STINGING

Catostylus tagi

Introduced species that entered the Mediterranean through the Gibraltar Strait. Usually observed alone, no swarms.

MILD STINGING

Marivagia stellata

Introduced species in the Mediterranean. Native from the Indo-Pacific. Usually observed alone, no swarms.

MILD STINGING

Jellyfish sting treatment recommendations

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Some jellyfish species may sting humans, determining local reactions and occasional systemic effects. Treatment of jellyfish envenomation aims to attenuate venom effects, prevent further envenomation from residual jellyfish pieces, and keep in check occasional systemic reactions, including shock.

Depending on the jellyfish species, there is evidence and consensus on oral/topical analgesics, hot water and ice packs as effective painkillers. For a few species (see below), a short application of domestic vinegar may prevent further discharge of unfired jellyfish stinging cells left on the skin.

Most treatment approaches are presently founded on relatively weak evidence and further research is strongly recommended. Dissemination of appropriate treatment modalities is deployed in the framework of MED-JELLYRISK Project in colaboration with LIFE+ CUBOMED Project to better inform and educate all the personnel working at beach and those at risk.

According to the current medical literature about jellyfish sting treatments, in the present guide a synthesis is recommended for the most relevant species of the Spanish Mediterranean coast and all procedures with no consensus are excluded.

Immediate action protocol in case of jellyfish sting

A decision tree is presented next in order to facilitate the protocol implementation

If you have been stung by a jellyfish, do you recognize the species that caused the sting?

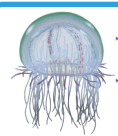
NO

Follow the instructions of the GENERAL JELLYFISH STINGING PROTOCOL (page. 35)

YES

Follow the instructions of the GENERAL PROTOCOL (page. 35)

Follow the instructions of the PROTOCOL CASE 1 (page. 36)



Follow the instructions of the PROTOCOL CASE 2 (page. 37)

Follow the instructions of the PROTOCOL CASE 3 (page. 38)

General protocol: Stinging produced by *P. noctiluca*, *R. pulmo*, *C. hysoscella* and by unrecognized species

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WARNING: DO NOT APPLY FRESHWATER, NO VINEGAR, NO PRESSURE BANDAGE, NO AMMONIA, NO ALCOHOL. Seek immediate medical attention if shock or breathing difficulties occur.

1) CAREFULLY WASH WITH SEAWATER, DO NOT RUB

2) IF AVAILABLE, APPLY FOR FIVE MINUTES A BAKING SODA SLURRY (50% commercial baking soda; 50% seawater) to prevent further envenomation from attached tentacles

3) USE TWEEZERS, GLOVES OR A PLASTIC CARD TO REMOVE RESIDUALS OF TENTACLES

4) APPLY ICE PACKS (wrapped in a cloth or thin towel, not directly on the skin) for 5-15 minutes - Warn victim that ice pack may be uncomfortable at first!

5) REASSESS PAIN AND REAPPLY ICE PACKS IF NECCESSARY

6) IF PAIN PERSISTS, CONSULT YOUR PHARMACIST OR HEALTH CARE PROFESSIONALS - Ask for analgesic + hydrocortisone preparations (e.g. lidocaine 3-4% + hydrocortisone).

Protocol case 1: Stinging produced by *Carybdea marsupialis*

WARNING:
DO NOT APPLY FRESHWATER, NO PRESSURE BANDAGE, NO AMMONIA, NO ALCOHOL.
Seek immediate medical attention if shock or breathing difficulties occur.

1) CAREFULLY WASH WITH SEAWATER, DO NOT RUB

2) WASH WITH COMMERCIAL VINEGAR

3) USE TWEEZERS, GLOVES OR A PLASTIC CARD TO REMOVE RESIDUALS OF TENTACLES

4) APPLY HOT PACKS OR HOT WATER IMMERSION (40-45°) for 5-15 minutes.

5) REASSESS PAIN AND REAPPLY HOT PACKS IF NECCESSARY

6) IF PAIN PERSISTS, CONSULT YOUR PHARMACIST OR HEALTH CARE PROFESSIONALS - Ask for analgesic + hydrocortisone preparations (e.g. lidocaine 3-4% + hydrocortisone).

Protocol case 2: Stinging produced by *Olindias phosphorica*

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WARNING:
DO NOT APPLY FRESHWATER, NO PRESSURE BANDAGE, NO AMMONIA, NO ALCOHOL.
Seek immediate medical attention if shock or breathing difficulties occur.

1) WASH WITH COMMERCIAL VINEGAR (4-6% acetic acid) - OTHERWISE, WASH WITH SEAWATER - DO NOT RUB

2) USE TWEEZERS, GLOVES OR A PLASTIC CARD TO REMOVE RESIDUALS OF TENTACLES

3) APPLY ICE PACKS (wrapped in a cloth or thin towel, not directly on the skin) for 5-15 minutes - Warn victim that ice pack may be uncomfortable at first!

4) REASSESS PAIN AND REAPPLY ICE PACKS IF NECCESSARY

5) IF PAIN PERSISTS, CONSULT YOUR PHARMACIST OR HEALTH CARE PROFESSIONALS - Ask for analgesic + hydrocortisone preparations (e.g. lidocaine 3-4% + hydrocortisone).

Protocol case 3: Stinging produced by *Physalia physalis*

WARNING:
DO NOT APPLY FRESHWATER, NO PRESSURE BANDAGE, NO AMMONIA, NO ALCOHOL.
Seek immediate medical attention if shock or breathing difficulties occur.

1) CAREFULLY WASH WITH SEAWATER, DO NOT RUB

2) USE TWEEZERS, GLOVES OR A PLASTIC CARD TO REMOVE RESIDUALS OF TENTACLES

3) APPLY HOT PACKS OR HOT WATER IMMERSION (40-45°) for 10-20 minutes.

4) REASSESS PAIN AND REAPPLY HOT PACKS IF NECCESSARY

5) IF PAIN PERSISTS, CONSULT YOUR PHARMACIST OR HEALTH CARE PROFESSIONALS - Ask for analgesic + hydrocortisone preparations (e.g. lidocaine 3-4% + hydrocortisone).

Characteristics of the sting produced by the different species of jellyfish and other cnidarians

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Carybdea marsupialis

The stinging of this species is very painful, but the effects last a short time. Usually red vesicles appear on the skin, and in some exceptional cases muscular cramps, vomiting, fatigue and anxiety may be observed.

Olindias phosphorica

After the sting of this species, characteristic red zig-zag lines appear on the skin. It produces immediately intense pain.

Pelagia noctiluca

The stinging cells have a very active venom that produces a burning sensation, intense pain, inflammation and redness. The sting produces hives and edema, in addition to vesicles and scabs that may appear and remain. Other symptoms, although rare, may be nausea, vomiting, muscle cramps and respiratory difficulty.

Chrysaora hysoscella

The effect of the toxin is similar to that of *P. noctiluca* producing similar reactions in the skin after contact.

Characteristics of the sting produced by the different species of jellyfish and other cnidarians

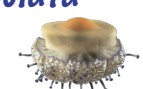
Rhizostoma pulmo

The sting may be painful, in general producing a light burning sensation and intense irritation. Even when the contact with jelly pieces or tentacles in the water does not produce important dermatologic symptoms, this species produces a mucus that contains stinging cells.

Physalia physalis

The stinging cells have a strong venom with neurotoxic, cytotoxic and cardiotoxic properties. The contact may produce burning and intense pain, and in some cases systemic reactions. In the contact area, a line of oval white vesicles in the centre with a red edge usually appears. Some general effects, although rare, include trembling, diarrhoea, vomiting and convulsions.

Cotylorhiza tuberculata



The irritating capacity of this species is limited, in part because of their short tentacles. If contact occurs, the effects are minor and include skin irritation and stinging.

Action protocol when jellyfish are present at the beach

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Species	Abundance	Time	Recommended action
Physalia physalis	2 or more individuals		Bathing prohibition and remove
Pelagia noctiluca *Rhizostoma pulmo* *Chrysaora hysoscella* *Carybdea marsupialis* *Olindias phosphorica*	More than 1 indiv m^{-2}	More than 3 hours	Bathing prohibition
Cotylorhiza tuberculata *Aurelia sp.* *Aequorea forskalea* *Velella velella* *Porpita porpita* *Discomedusa lobata* *Phyllorhiza punctata* *Mnemiopsis leidyi*	Irrelevant		Inform NO risk with these species

Report your sightings

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Required information

Density, geographic location, time of observation, meteorological conditions (winds, currents, sea state), jellyfish species, and send a photo when possible

Jellyfish density	Few (<1 indiv/10m^2)
	Some (>1 indiv/10m^2)
	Many (>1 indiv/m^2)

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INSTITUTO MULTIDISCIPLINAR PARA EL ESTUDIO DEL MEDIO
Ramon Margalef

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