

# Poisonous Marine Organisms In Turkey And First Medical Aids

Mustafa Alparslan  
Çanakkale Onsekiz Mart University,  
Faculty of Fisheries, Department of Hydrobiology, Çanakkale  
malparslan@comu.edu.tr

Hasan Barış Özalp  
Çanakkale Onsekiz Mart University,  
Faculty of Fisheries, Department of Hydrobiology, Çanakkale

Sadettin Doğu  
Çanakkale Onsekiz Mart University,  
Faculty of Fisheries, Department of Hydrobiology, Çanakkale

**Abstract:** There are many poisonous marine organisms in Black Sea, Mediterranean, Aegean Sea and Marmara Sea in Turkey. These organisms: *Trachinus draco*, *Scorpaena scrofa*, *S. porcus*, *Rhizostoma pulmo*, *Chrysaora hysoscella*, *Aurelia aurita*, *Pelagica noctiluca*, *Anemonia sulcata*. First aid : if tentacles of nematocysts are still stuck to the skin, they need to be removed gently. Be careful not to squeeze them as to not discharge more nematocysts. Local anesthetic spray or ointment may remove some of the pain on minor stings. Tannic acid is believed to work well. Give cardiovascular and respiratory assistance if needed. Medical treatment: The best anesthetic ointments in order of efficiency seem to be: Lignocaine 5%; Ultralan 0.5% . Lignocaine gel. Benadryl cream isn't as effective. Commercial creams don't work as long. Se For other jellyfish stings, soak or rinse the area in vinegar (acetic acid) for 15-30 minutes to stop the nematocysts from releasing their toxins. vere itching may occur after a few days. Steroid ointments (i.e. hydrocortisone) could help.

**Keywords:** Black Sea, Marmara Sea, Poisonous organisms, First aid.

## Introduction

Human deaths attributed to poisonous marine animals, particularly fishes, have been recorded since biblical times and some religious laws still condemn eating fish that are finless or scaleless. Figures of scaleless, poisonous fishes have been found on Egyptian tombs. Some early naturalists went further than just recognizing dangerous animals, they actually used marine toxins to remedy ailments. For example, Pliny the Elder (29–79 A.D.) used ground sting ray stingers to relieve the pain of toothaches.

The best procedure to follow, if you are stranded, starved, and have to eat a fish you know nothing about, is to skin it, remove the head and internal organs carefully, and then soak the remaining meat in water for several hours, throwing away the water before cooking. Many poisons from plants and animals are soluble in water. Often, cooking alone will not destroy or remove the toxic substances. In Japan, finer restaurants have licensed puffer cooks that have been specially trained in preparing puffer for human consumption. Yet the Japanese, even though they are familiar with poisonous fishes, suffer about 100 deaths yearly from puffer poisoning. Puffer poison has the scientific name tetrodotoxin, after the family name for puffer fishes, *Tetraodontidae*. It can take 10 minutes or 3 hours before symptoms are evident: nausea, vomiting, muscular weakness, paralysis, and respiratory distress. No specific antidote is known.

It is estimated that 30,000 human illnesses from eating poisonous marine animals, primarily fishes and shellfish, occur each year, some of them resulting in death. With figures like that, the title of the article "Eat Puffer and Maybe Suffer" should be taken seriously.

Fortunately, we are not rich in point of dangerous marine organisms according to Australia and New Zealand. owever, some poisonous fish and jellyfish effect to human during summer time in Turkey.:

### ***Scorpaena scrofa* Linnaeus, 1758 (Red scorpionfish)**

Distribution: Eastern Atlantic: British Isles (rare) to Senegal including Madeira, the Canary Islands, and

Cape Verde. Also throughout the Mediterranean except Black Sea. South African species thought to be the same as population in the northeast Atlantic.

Biology: Solitary and sedentary over rocky, sandy or muddy bottoms. Feeds on fishes, crustaceans and Mollusks

Human uses: Fisheries: commercial; aquarium: public aquariums

***Scorpaena porcus* Linnaeus, 1758 (Black scorpionfish)**

Distribution: Eastern Atlantic: British Isles to the Azores, and the Canary Islands, including Morocco, the Mediterranean Sea and the Black Sea..

Biology: Solitary and sedentary over rocky, sandy or muddy bottoms. Feeds on fishes, crustaceans and Mollusks

Human uses: minor commercial; aquarium: commercial

***Scorpaena notata* Rafinesque, 1810 (Small red scorpionfish)**

Distribution: Eastern Atlantic: Bay of Biscay to Senegal, Madeira, Azores and the Canary Islands, including the Mediterranean (rare in northern Adriatic) and the Black Sea (as *Scorpaena notata afimbria*).

Biology: Common in rocky littoral habitats. Feeds on crustaceans and small fishes. Flesh is tasty and used in making 'bouillabaisse'

Human uses: Fisheries: commercial; aquarium: commercial

***Scorpaena elongata* Cadenat, 1943 (Slender rockfish)**

Distribution: Eastern Atlantic: Mediterranean Sea and Morocco to off northern Namibia

Biology: Sedentary species which occurs in rocky areas. Feeds on fishes, shrimps and other benthic invertebrates

Human uses: Fisheries: minor commercial

***Scorpaena maderensis* Valenciennes, 1833 (Madeira rockfish)**

Distribution: Eastern Atlantic: Azores, Madeira, and Morocco to the Canary Islands, Cape Verde and Senegal. Also known from several localities in the Mediterranean Sea

Biology: Inhabits shallow coastal waters. Feeds on crustaceans and small fishes. Anterolateral glandular groove with venom gland

Human uses: Fisheries: commercial

***Trachinus draco* Linnaeus, 1758 (Greater weever)**

Distribution: Eastern Atlantic: Norway to Morocco, Madeira and Canary Islands, including the Mediterranean and the Black Sea, Reported from Mauritania

Biology: On sandy, muddy or gravelly bottoms, from a few meters to about 150 m. Rest on the bottom, often buried with eyes and tip of first dorsal fin exposed. At night they swim around freely, even pelagically. Feed on small invertebrates and fishes; chiefly nocturnal. Oviparous, eggs and larval stages pelagic. There are dark markings along the scales; the anterior dorsal fin is black and contains venomous spines. Utilized fresh and frozen; can be pan-fried, broiled, boiled and baked. Spawning takes place in June and August, pelagic eggs are 1 mm.

Human uses: Fisheries: minor commercial; gamefish: yes; aquarium: public aquariums

***Trachinus radiatus* Cuvier, 1829 (Starry weever)**

Distribution: Eastern Atlantic: Gibraltar to the Gulf of Guinea; probably further south. Known from the Mediterranean.

Biology: Found on sand and mud bottoms on the continental shelf from shoreline to a depth of about 150m. Oviparous. Eggs and larvae are pelagic.

Human uses: Fisheries: commercial

***Trachinus araneus* Cuvier, 1829 (Spotted weever)**

Distribution: Eastern Atlantic: Portugal to Angola. Also known from the Mediterranean

Distribution in the Turkish coasts: Marmara Sea, Aegean Sea and Mediterranean Sea

Biology: Inhabit shallow waters to about 100 m depth, burrowing in the bottom. Feed on small fishes and Crustaceans. Anterolateral glandular grooves and opercular spine with venom gland Oviparous, eggs and larvae are pelagic.

Human uses: Fisheries: minor commercial

***Echiichthys vipera* Cuvier, 1829 (Lesser weever)**

Distribution: Eastern Atlantic: North Sea to the Mediterranean, Morocco and Madeira. Reported from the Canary Islands

Distribution in the Turkish coasts: Marmara Sea, Aegean Sea and Mediterranean Sea

Biology: Littoral and benthic, on sandy, muddy or gravelly bottoms, from a few meters to about 150 m (in winter). Rest on the bottom, often buried with eyes and tip of first dorsal fin exposed. Considered as the most dangerous of the European weevers, both for its poison and for its frequent occurrence very near to beaches There are venom glands on the first dorsal fin, which is totally black, and on the gill cover

Human uses: Fisheries: minor commercial; gamefish: yes

***Dasyatis pastinaca* Linnaeus, 1758 (Common stingray)**

Distribution: Northeast Atlantic and Mediterranean Sea

Distribution in the Turkish coasts: Marmara Sea, Aegean Sea and Mediterranean Sea

Biology: Found over sandy and muddy bottoms, sometimes in estuaries and near rocky reefs. Feed on bottom fishes, crustaceans and mollusks. Ovoviviparous, gestation period about 4 months and 4-7 young are produced. Wings marketed smoked, dried-salted, and also used for fishmeal and oil. Harmful to shellfish banks; dangerous to bathers and fishers due to its poisonous spine. Barbed poison spine is a modified denticle that can be 35cm long, shed occasionally and replaced.

***Siganus luridus* Rüppell, 1829 (Dusky spinefoot)**

Distribution: Western Indian Ocean: Red Sea and East Africa to islands in the western Indian Ocean.

Immigrant to Mediterranean via the Suez Canal

Distribution in the Turkish coasts: South Aegean Sea and Mediterranean Sea

Biology: Found in small schools in very shallow water close to the bottom. Prefer hard bottoms of compacted sand with rock or coral debris. Solitary adults and groups of 3 or 4 adults have also been observed. Feed on a wide range of benthic algae. May suddenly stop and erect its fins (dorsal, anal and pelvic) presenting an encircling array of spined to potential predators; these spines are venomous. A food fish that is occasionally poisonous. Probably does not adapt well in captivity. Minimum depth from.

Human uses: minor commercial

***Siganus rivulatus* Forsskål, 1775 (Marbled spinefoot)**

Distribution: Western Indian Ocean: Red Sea and East Africa to islands in the western Indian Ocean.

Immigrant to Mediterranean via the Suez Canal

Distribution in the Turkish coasts: Aegean Sea and Mediterranean Sea

Biology: Inhabits shallow waters and generally in schools of 50 to several hundred individuals; prefers protected areas. Feeds by grazing on algae  
 Human uses: Fisheries: minor commercial; aquaculture: commercial

### First Aids for Poisonous Fish

Venomous fish stings: - stonefish - catfish -other venomous stinging fish	Wash the wound site and immerse in hot water about 45°C for a maximum duration of 90 minutes	<ol style="list-style-type: none"> <li>3. Irrigate the wound and remove foreign debris</li> <li>4. Radiograph to exclude retained spiny material</li> <li>5. Give oral or parenteral analgesia and occasionally local or regional anaesthesia for severe pain</li> </ol> <p>Stonefish antivenom is available for stonefish stings with severe pain or systemic effects Surgical consultation for involvement of joints or bones</p>
Stingray injuries	<ul style="list-style-type: none"> <li>• Wash the wound site and immerse in hot water about 45°C for a maximum duration of 90 minutes</li> <li>• Apply local pressure for bleeding and resuscitate if there are thoracic or abdominal injuries</li> </ul>	<ol style="list-style-type: none"> <li>6. Irrigate and debride the wound</li> <li>7. Titrate intravenous analgesia and/or local or regional anaesthesia</li> <li>8. Surgical consultation for deep injuries, injuries to the chest or abdomen, or with retained material</li> <li>9. Resuscitation and surgical intervention for major trauma from thoracic or abdominal injuries</li> </ol>

**Table 1.** First aids of poisonous fish

## Results

An estimated 500 or so poisonous fishes are inshore species living in warm seas between 45 degrees N and 45 degrees S. Many forms are numerous around small islands in the Pacific. Unfortunately, it is impossible to just look at a fish and tell whether it is poisonous. In some fishes, toxicity is strongly associated with the ripening of their reproductive organs or where the fish lives. Fish toxins are sometimes concentrated in a single organ, such as the liver, muscles, skin, or reproductive organs, or the whole animal may be poisonous.

Puffers, of course, are not the only poisonous fishes. Certain species of snapper, sea bass, barracuda, jack, moray eel, parrotfish, shark, grouper, wrasse, and surgeonfish have also been implicated in human illnesses. Most of these fishes contain one or several toxins, one of which is known as ciguatera toxin. Ciguatera is more famous in Pacific waters; however, in Florida, the red tide organism, *Karenia brevis*, a one-celled dinoflagellate, and shellfish exposed to blooms of this organism, reportedly have a ciguatera-like toxin that can cause human suffering. Ciguatera poison is thought to originate at the base of the food chain. In Pacific waters, it has been traced to toxic blue-green algae that are eaten by small fishes and, in turn, are eaten by larger fishes. It is through the food chain that the toxin is taken in and accumulated.

Perhaps other animals of the sea are better known as poisonous and dangerous animals to be avoided. Their effect on man is more direct—by attack. This involves stinging cells or venom glands. The sea wasps or jellyfish of the Austro-Asian area have caused many swimmers pain, scars, and even death. There have been 55 documented deaths attributed to sea wasps since 1963. *Physalia*, the Portugese Man-of-War, is a jellyfish-like animal known as a siphonophore that periodically causes swimming activity to cease along the Florida east coast and other areas. First-aid stations are set up on beaches to help those suffering from *Physalia* attacks. Jellyfish and siphonophores have stinging cells called nematocysts in their tentacles, and some *Physalia* tentacles have been reported to extend 30 feet deep in seawater. *Physalia* toxin interferes with the conduction of nerve impulses and can cause the heart to stop beating. In addition to poisonous jellyfish and siphonophores, there are poisonous or venomous (having venom glands) cone shells, octopuses, sea cucumbers, sea urchins, marine worms, and other ocean denizens.

In almost all cases, the toxin interferes with the permeability of the nerve membrane and inhibits passage of nerve impulses. The physical effect may only involve nausea, drowsiness, weakness, or vomiting, or it may

proceed to paralysis and death. In most cases, a cure is not known; however, a drug called neostigmine has been successful in the treatment of barracuda poisonings. Some human illnesses attributed to eating fish are caused by decomposing bacteria and are common among jacks, skipjacks, and oceanic bonito; however, symptoms usually subside within 12 hours.

It is estimated that 30,000 human illnesses from eating poisonous marine animals, primarily fishes and shellfish, occur each year, some of them resulting in death. With figures like that, the title of the article "Eat Puffer and Maybe Suffer" should be taken seriously.

Poisonous marine animals can kill people, but unbelievable as it may sound, they can save lives too. Natural products from land plants have been used for years as antibiotics, narcotics, analgesics, anti-leukemia agents, and other drugs in the treatment of human distress. Why not use products from marine plants and animals as drugs? After all, poisons from marine animals show potential in the treatment of hearing diseases, intestinal troubles, infections, tumors and other ailments.

One of the biggest problems is money. It takes approximately 7 million dollars to develop a drug before it is submitted to the federal Food and Drug Administration and then only 1 out of 2,500 drugs submitted reach the commercial market. Another problem involves the collecting and harvesting of suitable marine organisms. If the chemical structure and properties of the poison are known, then scientists can artificially recreate the substance and need not worry about how many animals they have to collect. Prior to the 1960s, little was known about the chemical makeup of marine toxins, but now that scientists have unraveled the chemistry of these poisons, synthesis of these potential drugs is possible.

There is one outstanding use of a marine poison as a drug—puffer poison is being used as a narcotic for terminal cancer patients in Japan. Perhaps the Japanese, because they are surrounded by the sea and depend on it so desperately for food, are more attuned to its resources. The Japanese also found that a certain acid in the brown seaweed *Digenia* is a valuable drug in the control of tapeworm, whipworm, and roundworm. There are many natural compounds of seaweeds that show antibacterial, antifungal, and antiviral activity. However, these are not poisons, rather they are often components of the cell walls or byproducts of everyday functions. Ironically, some poisons are thought also to be the byproducts of everyday functions, particularly among the one-celled organisms.

One product of marine seaweeds, although not of a poisonous nature, deserves attention because of its potential anti-tumor and anti-leukemia activities in animals exposed to radiation. Sodium alginates of seaweeds tend to inhibit the absorption of radioactive strontium in the bloodstream and bone tissue of rats by 75 percent.

To cite examples of potential uses for poisons or toxins often involves using the effect of the poison as the cure. For example, ciguatera poison, which affects the neuromotor system, can relax spasms when administered in small doses. Another poison isolated from an electric eel shows potential as an antidote for pesticide poisoning. These are only a few examples, but they are enough evidence to support research on potential drug sources from the sea.

### **Poisonous Jellyfish** ***Rhizostoma pulmo* Macri, 1778**

#### **Description**

Umbrella hemispherical, translucent; exumbrella surface finely granular, jelly thick, central portion stiff, thinner and flexible in outer third. With 8-12 velar marginal lappets per octant; marginal tentacles absent. Eight rhopalia; rhopalial lappets smaller than inter-rhopalar, pointed. Subumbrellar musculature in eight distinct peripheral muscle fields. Stomach occupying central third of bell, roughly square with concave sides; from it 16 substantial canals connect to bell edge; younger specimens have narrow ring canal which follows closely outline of each marginal lappet; in many older specimens ring canal apparently absent in places and perhaps in some is completely lacking; an intermediate ring canal about 1/3 of radius in from margin, broad; centripetal to this is a coarse, irregular anastomosing network of canals, connecting only with intermediate ring canal and not with radial canals. Peripheral to intermediate ring-canal a similar but finer meshwork, branchings become increasingly more fine towards perimeter. Manubrium short, massive and translucent; concealed by 16 scapulets upon it. Each scapulet small, inverted Y-shaped in section, bearing numerous mouthlets. The eight oral arms are inverted Y-shaped in section, supporting two long, massive, outwardly-directed blades also bearing numerous mouthlets. Oral arms without lateral clubs and filaments, each arm with a large, translucent terminal club. Four gonads, each a much convoluted lobe fundamentally forming most of a circle but not obvious due to

convolutions. In older animals surface of gonad bearing grooves extending to its edge.

### **Ecology**

Strobilation and the production of the ephyra stage seem restricted to the summer months; peak abundance of mature medusae in late summer and autumn with large numbers cast ashore in autumn and winter storms.

Specimens living in deeper offshore waters will probably survive the winter and can be encountered as late as June of the following year.

### **Depth range**

Medusae are usually recorded at or near the water surface, but probably being more abundant in the (coastal) water column as the result of the strong currents of ebb and flow and resting on the bottom during slack-water periods.

### **World distribution**

North and South Atlantic Oceans, Mediterranean, Black Sea, Red Sea.

Distribution in the Turkish coasts: Aegean Sea, Marmara Sea, Black Sea, Mediterranean Sea

### **Chrysaora hysoscella Linnaeus, 1767**

**Distribution:** Belgian Coast, Dutch Exclusive Economic Zone European waters

**Morphology:** Umbrella flat smooth and thick, 15-49cm in diameter, the color is variable, but is characterized by 16 v-shaped gold-brown or yellow-brown marks on the upper umbrella, radiating from the central region, there are 24 marginal tentacles, which are easily broken off, and thirty-two pigmented semi-circular marginal lappets. Present from half May until half September. Umbrella between 1 and 12 cm. Young medusa with umbrella diameter less than 4 cm have only 8 tentacles and are hard to distinguish from *Pelagia noctiluca* (Leloup, 1952, Russell, 1970). Small medusa (2-4cm) identified as *Pelagia noctiluca* (De Blauwe, 2001) were in fact *Chrysaora hysoscella*. (*C.hysoscella* was very intensive around Marmara Sea, Çanakkale Strait and Aegean Sea in 2009. Tentacles reached to 2.45 cm. (Ozalp, Alparslan, and Dogu, 2009).

### **Cassiopea andromeda Forskäl, 1775 (Upside down jellyfish)**

#### **Description**

This jellyfish usually lies mouth upward on the bottom, in calm shallow water, gently pulsating its bell to create water flow over its arms. The bell of *Cassiopea* is yellow-brown with white or pale spots and streaks. The outstretched arms are also brownish with extended frilly tentacles. Adults can grow to 30 cm in diameter. They are often mistaken as sea anemones. Habitat *Cassiopea* are typically found in shallow lagoons, intertidal sand or mud flats, and around mangroves. *Cassiopea* feed on drifting zooplankton. Individuals also harbor photosynthetic dinoflagellate algae that provides food to the jellyfish. The zooxanthellae live in the tissues on the ventral surface of the jellyfish, and the jellyfish sits on the bottom upside-down to provide sunlight to the symbiotic algae.

**Distribution** Hawaiian Islands Throughout main Hawaiian Islands. Native Range Indo-Pacific

#### **Danger to humans and first aid**

These jellyfish can deliver a painful sting. If stung, apply a cold pack to relieve the pain if necessary

*Aurelia aurita* Linnaeus, 1758

#### **Life History**

Sexual maturity in *Aurelia aurita* commonly occurs in the spring and summer. The eggs develop in gonads located in pockets formed by the frills of the oral arms. The gonads are commonly the most recognizable part of the animal, because of their deep and conspicuous coloration.

## **Anemonia sulcata Pennant, 1777**

A.sulcata has long tentacles and cnidoblast cells. .Approximately, that can reach 12-15 cm.long.Colors chances yellow and violet. Some effects of the sea anemone toxin, ATX-II, on vertebrate skeletal muscle have been described. At a concentration of  $1 \times 10^{-7}$ - $1 \times 10^{-6}$ M, ATX-II caused a sodium-dependent depolarization of the muscle fibres of the rat soleus and extensor digitorum longus, of the mouse soleus and extensor digitorum longus and of the chicken posterior latissimus dorsi. The muscle fibres of the frog sartorius were insensitive to the toxin. Action potentials generated by direct stimulation were prolonged by ATX-II, but the degree of prolongation was variable. Chicken posterior latissimus dorsi muscle fibres were most sensitive in this regard, and mouse extensor digitorum longus were least sensitive. Both denervated and immature muscle fibres were more sensitive to ATX-II than mature innervated muscle fibres. The sensitivity to ATX-II declined rapidly as muscle fibres matured. In some muscles, the prolongation of the action potential was enhanced by repetitive stimulation, but not by the passive depolarization or hyperpolarization of the muscle fibres. The actions of ATX-II could be reversed by washing in all but the innervated soleus of the mature rat.

### **Prevention**

Wear protective clothing (gloves, wet suits, dive skins) when swimming in jellyfish-infested areas. Avoid picking up dead jellyfish. Dead jellyfish may still have live nematocysts that can still release toxins (even after they have dried up). Avoid going into known jellyfish-infested areas. If you do, know what type of jellyfish are common to the area. Be prepared to treat a jellyfish sting. Have a basic first aid kit (make sure it has an oral antihistamine in the kit) prepared and bring it with you. Take a course in basic first aid before heading to the beach, snorkeling, swimming, or scuba diving. In the evening or at night when swimming, snorkeling, or scuba diving, take care to look for jellyfish on the surface of the water. Expel air from the alternate air source while ascending during scuba diving to disperse any jellyfish directly above you. Educate yourself as to the type of jellyfish that may be in the waters in which you are swimming, snorkeling, or scuba diving. Bring Safe Sea Jellyfish After Sting® pain relief gel in case you do get stung. Do not swim in waters where large numbers of jellyfish have been reported. Wearing a wet suit or Lycra dive skin can prevent stings. If you have a known insect sting allergy carry an allergy kit, which contains injectable epi-pens ([epinephrine, adrenaline](#)). Make sure those with you know how to administer the epi-pen in case you are unable to do so. Do not touch any marine life while swimming, snorkeling, or scuba diving. Most marine animals have a protective coating that when touched, is rubbed off when and exposes the animal to bacteria and parasites; moreover, touching, "playing," or moving marine animals is stressful for them. Corals are easily damaged when touched and the area if the coral touched by hands, fins, or the body will die. To protect the ocean environment, when swimming, snorkeling, or scuba diving look, don't touch, and leave only bubbles. Never use fresh water for the skin.

### **Jellyfish Stings Treatment**

If you are stung by a box jellyfish, seek medical help immediately. While you are waiting for medical help, flood the area with vinegar until medical help is available and keep as still as possible. If you are not close to medical care, soak the area and tentacles for 10 minutes or more, before attempting to remove them. If the sting is on the arms or legs, you can place a pressure dressing (like an ACE wrap used for a sprained ankle) around the sting. Be careful that you do not stop blood flow - the fingers and toes should always stay pink. This will help to slow down the spread of the toxin. For other jellyfish stings, soak or rinse the area in vinegar (acetic acid) for 15-30 minutes to stop the nematocysts from releasing their toxins. If you do not have vinegar available, rinse in sea water, 70% isopropyl alcohol, or Safe Sea Jellyfish After Sting® pain relief gel. Do not use fresh water. Fresh water will cause the nematocysts to continue to release their toxin. For the same reason, do not rub the area, apply ice or hot water. Remove tentacles with a stick or a pair of tweezers. Wear gloves if you have them available. Apply shaving cream or a paste of baking soda to the area. Shave the area with a razor or credit card to remove any adherent nematocysts. Then reapply vinegar or alcohol. The shaving cream or paste prevents nematocysts that have not been activated from releasing their toxin during removal with the razor. Eye stings should be rinsed with a commercial saline solution like Artificial Tears; dab the skin around the eyes with a towel that has been soaked in vinegar. Do not place vinegar directly in the eyes. Mouth stings should be treated with 1/4 strength vinegar. Mix ¼ cup of vinegar with ¾ cup of water. Gargle and spit out the solution. Do not drink or swallow the solution. For pain, take acetaminophen (Tylenol) 325 mg 1-2 tablets every 4-6 hours for pain; or Ibuprofen (Motrin) or Aleve every 8 hours for pain. CPR may be necessary for all stings if the person stops breathing and/or no longer has a pulse.

## References

- Bilecenoglu, M.(2002).A new jellyfish in Turkish Coasts: Cassiopea andromeda (Forsskal,1775)
- Chu, G.W. and C.E. Cutress. (1954). Human dermatitis caused by marine organisms in Hawaii. Proc. Haw. Acad. Sci.1953-54:-9.
- Coleman, N. (1991). Encyclopedia of Marine Animals. Blandford: London, U.K. 33.
- Cooke, W.J. (1984). New scyphozoan records for Hawaii: Anomalorhiza shawi Light 1921 and Thysanostoma loriferum (Ehrenberg 1835); with notes on several other rhizostomes. Proc. Biol. Soc. Wash. 97: 583-588.
- Cornelius, P. (2010). *Aurelia aurita* (Linnaeus, 1758). Accessed through: World Register of Marine Species at <http://www.marinespecies.org/aphia.php?p=taxdetails&id=135306> on 2010-05-09
- Cutress, C.E. (1961). [Comment on introduced jellyfish in Hawaii] p. 549, in: Doty, M.S. 1961. Acanthophora, a possible invader of the marine flora of Hawaii. Pac. Sci. 15(4): 547-552
- Handal, K. (1992).American Red Cross.Part 2: First aid and Safety Handbook.1.st.ed.Boston,MA: Little,Brown and Company;1992:59-62
- Hernroth, L. and Grondahl, F. 1983. On the Biology of *Aurelia Aurita*. Ophelia, 22(2):189-199.
- <http://web.ukonline.co.uk/aquarium/pages/greaterweever.html>.Retrieved 2006-09-22.
- <http://www.emedicineHealth.com>
- <http://www.fishbase.org>
- [http://www.suite101.com/blog/johnblatchford/mauve\\_stingers#ixzz0nRE1qElo](http://www.suite101.com/blog/johnblatchford/mauve_stingers#ixzz0nRE1qElo)
- Hummelinck, P. W. (1968). Caribbean Scyphomedusae of the genus Cassiopea. Studies on the Fauna of Curacao and other Caribbean Islands. 25: 1-57
- Hummelinck, P. W. (1968). Caribbean Scyphomedusae of the genus Cassiopea. Studies on the Fauna of Curacao and other Caribbean Islands. 25: 1-57.
- Hyman, L. (1940). The Invertebrates: Protzoa through Ctenophora. Mc Graw Hill Inc., New York. 497-538.
- Kideys A.E. and Gücü, A.C. (1995). Rhophilema nomadica: A poisonius Indo-Pasific Scyphomedusan New to the Mediterranean Coast of Turkey. *Israel Journal of Zoology* 41: 615-617.)
- Malej, A. Faganeli, J. and Pezdic, J. (1993). Stable isotope and biochemical fractionation in the marine pelagic food chain. *Marine Biology*, 116(4): 565-570.
- Özalp, H.B., Alparslan, M and Doğu, S (2009). Monitoring Researches on *Chrysaora hysoscella* (Linnaeus, 1766) around Çanakkale Strait. 13th. Underwater Science and Technologies Conference. November,2009.p.71-73.
- Uchida, T. (1970). Occurrence of a rhizostome medusa, *Cassiopea mertensii* Brandt from the Hawaiian Islands. *Annotat. Zool. Jap.* 43:102-104.
- Uchida, T. (1970). Occurrence of a rhizostome medusa, *Cassiopea mertensii* Brandt from the Hawaiian Islands. *Annotat. Zool. Jap.* 43:102-104.