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Hazardous Aquatic Animals

Animals and plants use a variety of poisons and venoms as protection from other organisms which might harm them. Harmful marine species are more common than harmful freshwater species and marine invertebrates are usually more venomous than fishes. Invertebrates cannot escape predation as easily as fish and have adapted to protect themselves. Aquatic animals can harm humans in different ways.

Bites

Bites can be inflicted by almost any animal with a mouth or pincers. Bites from animals with any teeth that face backwards, for example moray eels, may cause particularly severe wounds. These animals find it difficult to let go of an object once they have bitten it and will hold on to try and tear it apart. Special care should be taken when looking after these animals and suitable PPE (such as gloves) should be worn where appropriate.

Spines

Many fish, such as catfish, possess bony spines that will puncture skin with ease. These spines are often on the leading edge of the dorsal or pectoral fins but can also be a 'spur' towards the caudal fin. Some fish also possess tough, bony parts, such as fin covers which may also cause wounds if handled carelessly or incorrectly. Sea urchins, starfish and some worms also have spines that can puncture the skin.

Shocks

Some fish, such as the electric eel (*Electrophorus electricus*) and the electric catfish (*Malapterurus electricus*) stun their prey with electric shocks. Each subsequent shock in a series of shocks, decreases in severity. The animal requires time to build up its electrical stores before it can provide a more powerful shock again. Due to their complex needs and potential to harm humans, it is recommended these species are not stocked.

Poison

A poisonous animal possesses toxic substances in its tissues. When the animal is eaten these substances can harm the predator in varying degrees. Examples of poisonous species include puffer fish used in Japanese cuisine. It is worth noting that puffer species are also capable of releasing a poison from the mouth which kills fish when stressed or frightened. Good hygiene is essential when working with ponds and aquariums but especially those which contain poisonous species.

Venom

A venomous animal produces toxins in a secretory organ or group of cells, often using the toxin to attack as well as to defend itself. They also usually possess a venom duct and some sort of apparatus for delivering the venom, often a biting or stinging mechanism. All venomous animals are poisonous, but a poisonous animal is not necessarily venomous. The severity of the attack is dependent upon the venom involved, the susceptibility of the victim, the temperature and other physical and chemical considerations. Some venoms

cause mild reactions such as a rash or itching, however, some can cause paralysis or even death. Many animals produce venom which is not harmful to humans at all. This may be because the animal is unable to penetrate human skin to deliver the venom, it may not be produced in enough quantity or may not be of sufficient strength to affect large animals. The effects of venom are often related to size of the individual, the larger the organism the more effect their venom has.

Specific examples

There are some commonly found species in the aquarium trade which may pose a risk to humans:

Rays

Many rays carry one or more long, serrated and venomous spine near the base of their whip-like tail.

Catfishes

The dorsal and pectoral fins of most species are armed with strong, curved and often serrated spines. These are always associated with venom glands and can inflict a particularly painful wound. When stepped on or handled roughly, the spines break through their usual cover of skin and penetrate the victim causing severe pain.

Tangs

Tangs possess a small spur on either side of their body towards the caudal fin, at the base of which is a venom gland. Their quick, random turns often cause accidental wounds when handled.

Scorpionfishes (including lionfish)

The venomous dorsal spines can inflict injuries and can, in rare instances, break off in the wound. Care should be taken when working with decorated aquaria, when individual fish may be hidden behind rocks.

Echinoderms (sea urchins, starfishes, and sea cucumbers)

Echinoderm spines can break off after penetrating the skin and can be difficult to remove as they have backward facing barbs.

Sea cucumbers

These animals must be handled carefully or they may eject a sticky, stringlike substance if stressed. This may cause harm if ingested.

Molluscs (octopus, cone shells)

The blue-ringed octopus (*Octopus maculosus*) is highly venomous but will usually only bite when handled in order to escape. Several other species of octopus and squid harbour venom in their salivary glands, but the effect on humans is usually limited to localised pain and swelling. The potency of cone shell toxin depends on the species, but those that predate on fish have a particularly potent venom that can be lethal to humans. *Conus geographus*, *C. textile* and *C. purpurascens* are particular species to watch out for.

Coelenterates (hydroids, fire corals, jellyfish and anemones)

All anemones possess stinging cells, this is demonstrated by their tentacles 'sticking' to fingers. Many cannot harm or even be felt by people. Those that can be harmful include hell's fire anemones (*Actinodendron plumosum*) and carpet anemones (*Stichodactyla gigantea* and *Stichodactyla haddoni*). Fire corals (*Millepora* spp) can also deliver a sting which can be felt by humans. Jellyfish can sting humans with varying degrees of discomfort, always check the severity of the species' sting before interacting with it.

Additionally, some soft corals (*Palythoa* and *Zoanthus* species) can produce a highly toxic substance called palytoxin. This is highly dangerous and so these species should be handled appropriately. Please see our dedicated caresheet *How to prevent palytoxin poisoning* for more detailed information.

Bristleworms

Most species possess paired setae (bristle-like structures), projecting from the body which can easily pierce human skin. Some worms have tough biting jaws capable of penetrating the skin which produces a painful sensation, like that of a bee sting.

Blue-green algae

'Blue-green algae', more correctly cyanobacteria, can occur in ponds and lakes. When the wind blows surface blooms to the side of the pond they can be concentrated as often lurid green, paint-like scums. Quite a few of these scums can be toxic, with toxins absorbed through the skin, and of particular danger to pet dogs, which may try to lick the scum off their coats. In mild cases they may cause pond-keepers a skin rash, headache, or slight nausea. In severe cases they are neuro-toxic and they can kill dogs in minutes. If any such cyanobacteria are suspected, pondkeepers should keep pets away, and use long sleeved gloves for any work in and around the pond, especially if removing blanketweed. General hygiene advice, washing hands well after work in water, and not eating whilst working, also apply.

General advice

Some hazardous animals are accidentally imported with consignments. When an order is received it should be thoroughly checked to ensure only the animals which were ordered have been delivered and no 'stow-aways' are included. For example, some harmful species of cone shell may be mixed in with orange lip conch (*Strombus luhanus*).

The use of labels on aquaria indicating the presence of species of concern may serve to remind staff that particular care should be taken and to alert the public of potential risk. To avoid any further accidents from hazardous animals tanks containing these species should be placed in an accessible position, to avoid the "jerking" reaction of an injury causing damage to the aquarist. Although accessible, these tanks should be secure so that the animal cannot escape and untrained or young visitors cannot access them.

Ensure that all staff are aware of the potential hazards of the livestock held, the risks involved when interacting with them and how to react if an incident occurs. Written procedures may be advisable as part of your COSHH assessment and/or your written health and safety policy (Control of Substances Hazardous to Health (COSHH) regulations apply to animal and plant secretions, as well as to manufactured products)

Most animals only attack when provoked and should be treated with care and respect. Members of staff should avoid touching them. If cleaning an aquarium containing hazardous species, staff should have a means of preventing the species from approaching their hands. When catching livestock, care should be taken that their spines do not become entangled in the net. In some instances, it may be advisable to catch these species directly into a plastic bag.

Appropriate PPE should be provided to all members of staff to prevent harm where possible. To prevent poisoning, hands should be washed after they have been immersed in any aquarium/pond and before eating, drinking or smoking.

Accidents, however minor, with harmful species should be recorded in the accident book. Medical advice should be sought when any incident occurs.

When selling species that are potentially harmful, it is essential that the purchaser is aware of the risks associated with that animal.

Treatment

Treatment of any injury will be determined by the type of injury and species involved. Many individuals experience shock when they have been injured. This can be compounded by not knowing the full extent the injury may have. It is therefore very important to reassure the victim and treat as for shock. Many bites and stings give intense pain, but often this is the only problem and any further complications are unusual.

Reactions vary depending on the injury and species involved, but generally there is sudden intense pain at the site of the injury. With stings or bites, this area may become hot or swollen and the pain may gradually increase in intensity and spread to adjacent areas (e.g. from finger to arm). The pain may last for a few hours or for days, leaving a tenderness for some time afterwards. Victims of injury may display a range of other symptoms. These may vary from mild itch or nausea to blurred vision, fever, vomiting, breathing difficulties, delirium, shock, convulsions, unconsciousness and heart failure. The wound may be prone to secondary infections and should be cared for appropriately.

Do not suck the wound, slash the wound site, apply a tourniquet, give fluids to the victim or try to walk them. Reassure the victim and call the hospital. Although you should always consult a medical professional, it might be wise to keep anti-histamines in the first aid box, should the emergency services suggest they are taken to try and denature any venom.

Medical advice should be obtained when any incident occurs. If someone is stung or poisoned, full details of the incident and the species involved should be available to a doctor, who might then seek further advice from the National Poisons Unit in London, or the Nuffield Department of Clinical Medicine, John Radcliffe Hospital, Oxford.

