All about Leeches

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Most people think of leeches as nasty bloodsucking creatures with little or no worth, and no interesting behaviors, let alone any parenting skills, but this popular perception of them is way off the mark. A common misconception about leeches is that there is only one kind of leech. In fact, there are between 700 and 1000 species of leeches worldwide and they can be found in a variety of different habitats including marine, estuarine, moist terrestrial (particularly in Australia and Southeast Asia) and freshwater ecosystems. Within these habitats, leeches can be found attached to various substrates including fish and other marine creatures (marine and estuarine), underneath rocks or clinging to vegetation (moist terrestrial), or living on submerged wood, stones, and aquatic vegetation in ponds, streams, and rivers. Even if you know where to look for them, leeches can still be difficult to find since many species are often well camouflaged, blending in perfectly with their environment and making them extremely hard to locate.

Despite their close association with medieval medicine, leeches today are used for a variety of medical purposes including providing useful treatments for arthritis, blood-clotting disorders, varicose veins and other circulatory disorders and are also used in modern plastic and reconstructive surgery. In addition to their medical uses, leeches are quite fascinating in their own right and have some very interesting behaviors. For instance, it turns out that many leech species are very good parents, caring for their young in a manner that resembles the care shown by birds or even mammals. They can care for their young in a variety of ways including building nests for them, carrying broods of eggs or young attached to their ventral surface, or even, in several species, carrying the eggs and young in an internal pouch (like a marsupial). In quite a few cases, the parent leech also feeds its young, either directly providing nutrients across the body wall or, more frequently, by capturing and killing prey for the youngsters to feed on until they are big enough to provide for themselves.

What do leeches eat?

Contrary to popular belief, not all of them are bloodsuckers. In fact, many of them are sit-and-wait predators and feed on a variety of different invertebrates such as insects (gnats, mosquito larvae, water bugs), oligochaetes (both aquatic blackworms and their terrestrial cousins, the earthworms), amphipods (side swimmers), and lots of different kinds of molluscs including pond snails and freshwater clams. These predacious leeches are either engulfers (ie. they swallow their prey whole) or they are equipped with a protrusible proboscis which resembles a hypodermic needle. When not in use, the proboscis is retracted into the mouth, but when a leech has located a prey item, the proboscis pops out of the mouth and the leech uses it to spear its prey and then, once the prey is subdued, the leech uses the hollow proboscis like a soda

straw and sucks up the juices of its prey.

Some leeches with a proboscis and others that have jaws are temporary ectoparasites on a variety of different vertebrates including fish, turtles, crocodiles, and humans. These are the bloodsuckers and are the ones that most people think of when the word “leech” is mentioned. They don't need much introduction since they are infamous in their own right, having had starring roles in movies such as the Hollywood classic, *African Queen*, and, more recently, *Stand by Me* and even the BBC television comedy *Black Adder*. Many bloodsuckers use jaws instead of a proboscis with which to bite their hosts and depending on which family the bloodsucker belongs to, they can have either two or three jaws. The jaws look like tiny half circular saw blades and are extremely sharp and have either small teeth or a cutting edge. The two-jawed kinds leave a V-shaped bite and the three-jawed ones leave a Y-shaped bite. Bloodsucking or sanguivorous (blood-feeding) leeches will readily feed on fish, reptiles (turtles and crocodiles), amphibians (frogs), waterfowl (ducks, etc.), and mammals including humans, but when larger prey are scarce, they have been known to feed on earthworms or other available invertebrates to tide them over until their next blood meal.

Besides feeding on everything from snails to humans, leeches themselves are often preyed upon by other organisms and can form an important part of the diet of some other aquatic predators including other invertebrates such as dragonfly or damselfly nymphs and vertebrate predators including fish, amphibians, and waterfowl.

What are leeches?
Leeches are members of the Phylum Annelida which also includes the polychaetes (marine sandworms and bristleworms) and Oligochaetes (aquatic blackworms, terrestrial earthworms). Structurally, leeches most closely resemble their nearest relatives, the oligochaetes. Like them, the leech body is composed of a series of segments, but unlike the oligochaetes which can have a variable number of segments, leeches always have two pre-oral and 32 post-oral segments. In addition, oligochaete body segments are never subdivided and are represented by a single ring (annulus), but leech body segments are always subdivided into two or more rings (annuli) per body segment. Besides differences in body segmentation, leeches also lack the bristles (chaetae or setae) which other annelids use for locomotion, replacing them instead with a sucker at each end of the body.

How do leeches move?
Leeches can move by alternately attaching and detaching these suckers, crawling about in a looping inch-worm like motion. Besides crawling about by means of their suckers, many aquatic species can flatten their bodies and swim, resembling eels as they move through the water.

How do leeches find their food?
Leeches can detect their prey with several different sets of sensory structures, some of which can be quite sophisticated. They do have simple eyes, located at the anterior end, but these are incapable of forming an image and are only used to detect changes in light intensity and possibly some movement. They

rely instead either on smell/taste (chemoreception) or on detecting vibrations (mechanoreception) using special structures called sensilla. Bloodsucking leeches, for instance, find and track their prey using both chemo- and mechanoreception. They first use mechanoreception to detect potential prey which might be either thrashing about in the water or alternatively walking through the bush. After following the vibrations to the scene, they can then home in on their prey by following the scent or in terrestrial leeches a carbon dioxide gradient emanating from the animal. Alternatively, a predaceous engulfing leech, *Motobdella montezuma*, has been found to track its prey, the amphipod, *Hyalella montezuma*, by passive sonar. It listens for the vibrations made by *Hyalella* when it swims and *Motobdella's* hearing is sophisticated enough that it can discriminate among the different size classes of the amphipod, skipping over any that are too big or too small and homing in on those that are just the right size for it to eat.

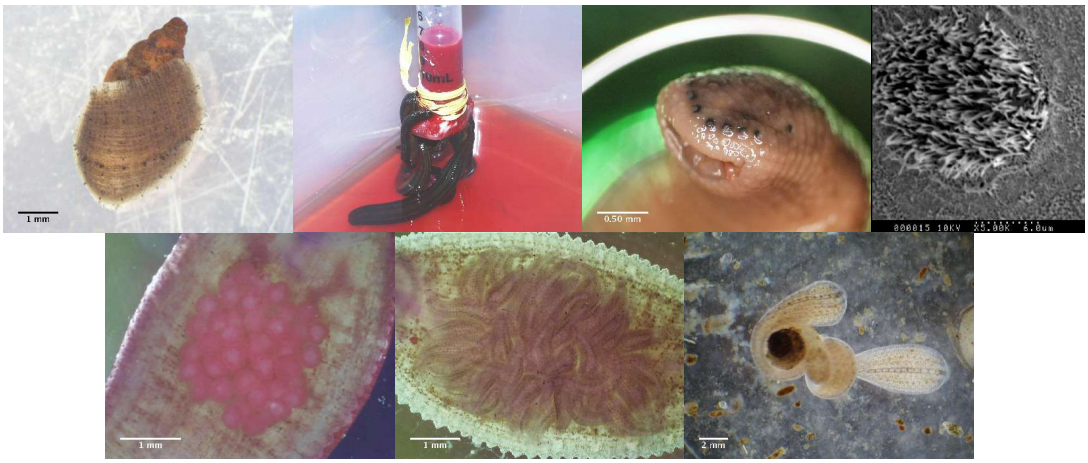

Figure 1: From left to right in top row: Australian snail leech (*Alboglossiphonia australiensis*) eating a snail. Australian “tiger” or horse leech (*Richardsonianus australis*) feeding on horse blood. Australian terrestrial leech (*Philaemon*) showing its eyes. Sensilla (motion sensor) from a bloodsucker. From left to right bottom row (*Helobdella papillornata*): Eggs attached to the stomach of their parent. Young after they hatch and remain attached to the stomach of their parent. Several young snail leeches feeding on a snail together.