

Leeches

Biology



Illustration: K. Dempsey

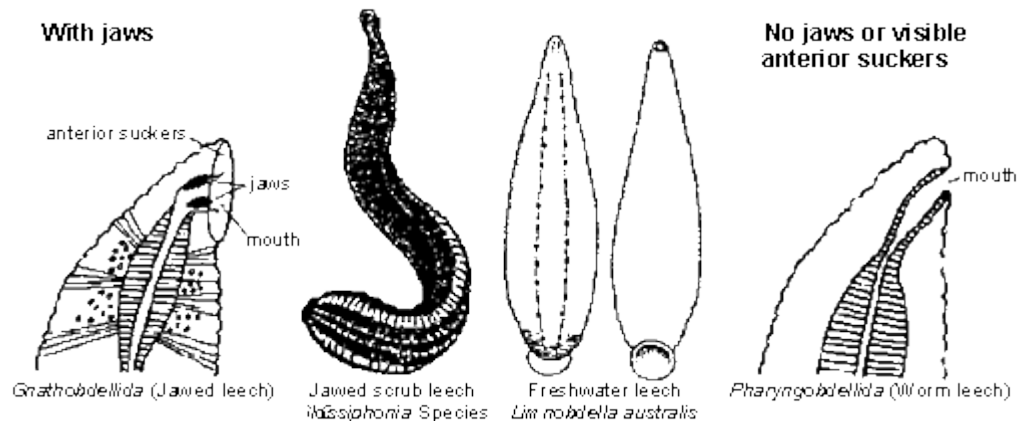
Leeches are annelids or segmented worms, and although closely related to the earthworms, are anatomically and behaviourally more specialised.

The bodies of all leeches are divided into the same number of segments (34), with a powerful clinging sucker at each end (although the anterior, or front sucker can be very small). Body shape is variable, but to some extent depends on the degree to which their highly muscular bodies are contracted. The mouth is in the anterior sucker and the anus is on the dorsal surface (top) just in front of the rear sucker.

Leeches usually have three jaws and make a Y-shaped incision. The Australian land leech has only two jaws and makes a V-shaped incision. Australian leeches can vary in size from about 7 mm long to as much as 200 mm when extended.

Different Types

Leeches are grouped according to the different ways they feed. One group (the jawed leeches or *Gnathobdellida*) have jaws armed with teeth with which they bite the host. The blood is prevented from clotting by production of a non-enzymatic secretion called hirudin. The land leech commonly encountered by bushwalkers is included in this group.



Jaw drawings, after M. Stachowitsch **The Invertebrates - an Illustrated Glossary**

A second group (the jawless leeches or *Rhyncobdellida*) insert a needle-like protrusion called a proboscis into the body of the host and secrete an enzyme, hemetin which dissolves clots once they have formed. Leeches which live on body fluids of worms and small freshwater snails possess such an apparatus.

A third group, (the worm leeches or *Pharyngobdellida*) have no jaws or teeth and swallow the prey whole. Its food consists of small invertebrates.

Respiration

Respiration takes place through the body wall, and a slow undulating movement observed in some leeches is said to assist gaseous exchange. Aquatic leeches tend to move to the surface when they find themselves in water of low oxygen content. As a fall in atmospheric pressure results in a small decrease in dissolved oxygen concentrations, rising leeches in a jar of water provided nineteenth century weather forecasters with a simple way of predicting bad weather.

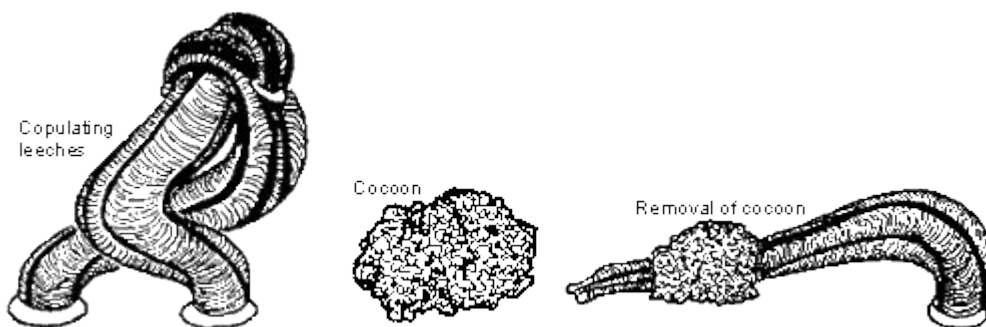
Sense Organs

Sensory organs on the head and body surface enable a leech to detect changes in light intensity, temperature, and vibration. Chemical receptors on the head provide a sense of smell and there may be one or more pairs of eyes. The number of eyes and their arrangement can be of some use in Identification, however to properly identify a leech, dissection is required.

The *Rhyncobdellids* are capable of dramatic colour changes, and although not an attempt at camouflage, the significance of this behaviour is unknown.

Reproduction

As hermaphrodites, leeches have both male and female sex organs. Like the earthworms they also have a clitellum, a region of thickened skin which is only obvious during the reproductive period. Mating involves the intertwining of bodies where each deposits sperm in the others' clitellar area. Rhyncobdellids have no penis but produce sharp packages of sperm which are forced through the body wall.



The sperm then make their way to the ovaries where fertilisation takes place. The clitellum secretes a tough gelatinous cocoon which contains nutrients, and it is in this that the eggs are deposited.

The leech shrugs itself free of the cocoon, sealing it as it passes over the head.

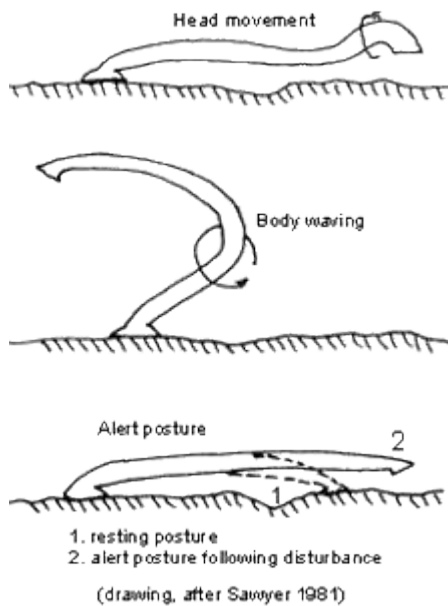
The cocoon is either buried or attached to a rock, log or leaf and dries to a foamy crust. After several weeks or months, the young emerge as miniature adults. Studies show that the cocoons are capable of surviving the digestive system of a duck. Leeches die after one or two bouts of reproduction.

Feeding

Most leeches are sanguivorous, that is they feed as blood sucking parasites on preferred hosts. If the preferred food is not available most leeches will feed on other classes of host. Some feed on the blood of humans and other mammals, while others parasitise fish, frogs, turtles or birds. Some leeches will even take a meal from other sanguivorous leeches which may die after the attack.

Sanguivorous leeches can ingest several times their own weight in blood at one meal. After feeding the leech retires to a dark spot to digest its meal. Digestion is slow and this enables the leech to survive during very long fasting periods (up to several months).

Foraging - How does a leech go about searching for a blood meal?



A hungry leech is very responsive to light and mechanical stimuli. It tends to change position frequently, and explore by head movement and body waving. It also assumes an alert posture, extending to full length and remaining motionless. This is thought to maximise the function of the sensory structures in the skin.

In response to disturbances by an approaching host, the leech will commence "inchworm crawling", continuing in a trial and error way until the anterior sucker touches the host and attaches. Aquatic leeches are more likely to display this "pursuit" behaviour, while common land leeches often accidentally attach to a host.

The Bite

When a jawed leech bites it holds the sucker in place by making its body rigid. Using its semi circular and many toothed jaws like minute saws, it then makes an incision in the skin and excretes a mucous from the nephropores (external openings from the kidney-like organs). This helps the sucker to adhere. A salivary secretion containing the anticoagulant and a histamine floods the wound and the leech relaxes its body to allow the blood to be ingested. This mixture allows the blood to flow and also prevents clotting once inside the leech. A bacterium in the gut of the leech assists the digestion of the blood, and it has been shown that the type of bacterium varies with the type of host on which the leech feeds. The bacterium also prevents growth of other bacteria which may cause the ingested blood to putrefy.

Habitat

Most leeches are freshwater animals, but many terrestrial and marine species occur.

Land leeches are common on the ground or in low foliage in wet rain forests. In drier forests they may be found on the ground in seepage moistened places. Most do not enter water and cannot swim, but can survive periods of immersion.

In dry weather, some species burrow in the soil where they can survive for many months even in a total lack of environmental water. In these conditions the body is contracted dry and rigid, the

suckers not distinguishable, and the skin completely dry. Within ten minutes of sprinkling with a few drops of water, these leeches emerge, fully active.

Freshwater leeches prefer to live in still or slowly flowing waters, but specimens have been collected from fast flowing streams.

Some species are considered amphibious as they have been observed in both terrestrial and aquatic habitats.

Uses in Medicine

For over 2000 years, leeches were needlessly applied for many ailments as an adjunct to blood letting. Their use in Europe peaked between 1830 and 1850, but subsequent shortages led to a decline in their use. Today there is a real clinical application in that they are of great value to plastic surgeons when venous congestion of skin and muscle flaps is a problem.

Leeches are treated in the same way as blood products and are reused only on the same patient.

Medical use of leeches also includes treatment of black eyes, and hirudin is used in the treatment of inflammation of the middle ear. Hirudin is also being developed for experimental use as a systemic anticoagulant, and may prove useful in invitro blood sampling.

Repellents

The most common enquiry regarding leeches concerns repellents. It is unknown whether a specific preparation is commercially available but there is a plethora of tried and tested, but unproven leech-protection ideas. These include a lather of bath soap smeared on exposed parts and left to dry, applications of eucalyptus oil, tropical strength insect repellent, lemon juice and impenetrable barriers of socks and pantyhose.

The Wound

The presence of hirudin in the wound following a leech bite may cause oozing to continue for several hours. Although inconvenient, blood loss is not significant.

Gut bacteria can cause wound infection. In the post-operative use of leeches this is closely monitored and dealt with by use of the appropriate antibiotic.

There may also be a delayed irritation and itching after a bite. There appears to be no support for the theory that mouthparts left behind after forced removal of the leech causes this reaction.

Can leeches transmit disease? There is no evidence to suggest that they do. The presence of trypanosomes, (malarial parasites), in the gut of jawless leeches has been noted, but jawed leeches do not appear to be hosts.

Allergy to leech bite has been reported. Medical opinion should be sought, depending on the severity of the reaction.

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CLOSE ENCOUNTERS OF A LEECH KIND

Leeches tend to be an unpleasant nuisance rather than a danger, but in view of the fact that there have been several instances in our club of people reporting very severe wound infections secondary to leech bites, it seems appropriate to provide members with the following information in the interest of health and safety.

Prevention

- ◆ As leeches are generally found in wet or damp forest areas, it is wise to dress appropriately i.e. with clothing which minimizes skin exposure eg long sleeves and long pants or gaiters. Socks over trouser legs if you do not have gaiters. Light-coloured socks can help leeches to be easily spotted.
- ◆ Maximum or tropical strength insect repellents may be used. Although their effectiveness has been disputed by some, it is still generally considered worthwhile to use these products. Eucalyptus oil has also been suggested in the literature.
- ◆ Inspect for freeloaders at regular intervals or rest stops.

Removal and treatment

Traditionally, it has been recommended that leeches be removed with a harsh agent such as salt, but this practice is now discouraged, as current belief holds that this may damage the bite and cause added pain. Besides this and very importantly, it can also damage the leech and cause it to regurgitate stomach bacteria into the wound, subsequently leading to infection of the wound. Another school of thought for removing the leech was to burn the freeloader, but this also has inherent risk (which does not need describing !)

Hence the following and most up-to-date guidelines for the removal and treatment of the leech bite are as follows.

1. Do not attempt to crush or burn the leech
2. Find the oral sucker. This is at the small end of the leech
3. Place your fingernail next to the sucker. Push towards the bite. Attempt to push the sucker to the side, away from the skin.

4. Once the oral sucker is detached, quickly detach the sucker at the other end of the leech (the large end of the leech). This can be done by flicking the leech or by pushing the underside of the leech and up against the sucker
5. CLEAN THE WOUND TO PREVENT INFECTION, to remove detached sucker parts and to remove the anti coagulant which the leech has secreted.
6. The wound may bleed for a while but should then proceed to heal normally.
7. KEEP THE WOUND CLEAN AND DRY. Covering is recommended to stop contaminating dust or soil entering the wound and causing infection.
8. Allergic reactions can occur (rarely) in response to leech bites. If there are signs of severe reactions, seek medical help. Monitor the wound for infection in the following days and contact a doctor if the wound becomes infected.
...and Good Luck... although Good Management will probably yield better results.

Lynda Larkin\, Melbourne Bushwalkers July 2007 newsletter

YOUR LEECH ENCOUNTERS

Many of us have had close encounters of the leech kind. I have experienced cellulitis that spread up to my knee from a bite near an ankle. I have gone to 'mark my territory' and found a well fed leech curled up in my knickers.

Send me the gory details of your most confronting leech experiences.

Val Ford