Aquatic insect

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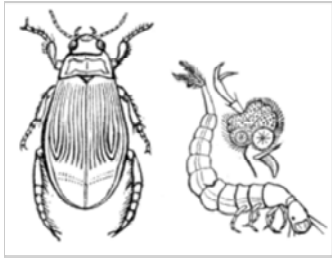
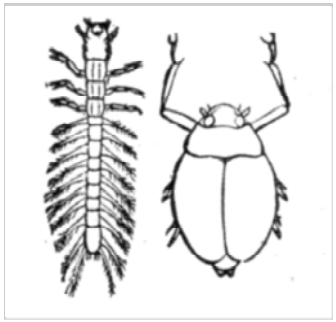
Aquatic insects or **water insects** live some portion of their life cycle in the water. They feed in the same ways as other insects. Some *diving* insects, such as predatory diving beetles, can hunt for food underwater where land-living insects cannot compete.



A water beetle



A whirligig beetle

Contents

Breathing

One problem that aquatic insects must overcome is how to get oxygen while they are under water. All animals require a source of oxygen to live. Insects draw air into their bodies through spiracles, holes found along the sides of the abdomen. These spiracles are connected to tracheal tubes where oxygen can be absorbed. All aquatic insects have become adapted to their environment with the specialization of these structures.

Aquatic adaptations

1. Simple diffusion over a relatively thin integument
2. Temporary use of an air bubble
3. Extraction of oxygen from water using a plastron or physical gill
4. Storage of oxygen in hemoglobin molecules in hemolymph
5. Taking oxygen from surface via breathing tubes (siphons)

The larvae and nymphs of mayflies, dragonflies and stoneflies possess tracheae but when in larval stage the tracheae are connected to gills, which are very thin extensions of the exoskeleton through which oxygen in the water can diffuse.

Some insects have densely packed hairs (setae) around the spiracles that allow air to remain near, while keeping water away from, the body. The trachea open through spiracles into this air film, allowing access to oxygen. In many such cases, when the insect dives into the water, it carries a layer of air over parts of its surface, and breathes using this trapped air bubble until it is depleted, then returns to the surface to repeat the process. Other types of insects have a plastron or physical gill that can be various combinations of hairs, scales, and undulations projecting from the cuticle, which hold a thin layer of air along the outer surface of the body. In these insects, the volume of the film is small enough, and their respiration slow enough, that diffusion from the surrounding water is enough to replenish the oxygen in the pocket of air

as fast as it is used. The large proportion of nitrogen in the air dissolves in water slowly and maintains the gas volume, supporting oxygen diffusion. Insects of this type only rarely need to replenish their supply of air.

Other aquatic insects can remain under water for long periods due to high concentrations of hemoglobin in their hemolymph circulating freely within their body. Hemoglobin bonds strongly to oxygen molecules.

A few insects such as water scorpions and mosquito larvae have breathing tubes ("siphons") with the opening surrounded by hydrofuge hairs, allowing them to breathe without having to leave the water.

Orders with aquatic or semi-aquatic species

- Collembola - springtails (which are not technically insects, but are closely related)
- Ephemeroptera - mayflies
- Odonata - dragonflies and damselflies
- Plecoptera - stoneflies
- Megaloptera - alderflies, fishflies, and dobsonflies
- Neuroptera - lacewings
- Coleoptera - beetles
- Hemiptera - true bugs (water striders, giant water bugs)
- Hymenoptera - ants (e.g. *Polyrhachis sokolova*) and wasps
- Diptera - flies and mosquitoes
- Mecoptera - scorpionflies
- Lepidoptera - moths
- Trichoptera - caddisflies

References

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- Farb, P. (1962). The Water Dwellers [LIFE]INSECTS pg. 142.
- Meyer, J.R. (2006), "Respiration in Aquatic Insects (http://www.cals.ncsu.edu/course/ent425/tutorial/aquatic.html)". (Accessed 25 April 2008)
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- Wigglesworth, Vincent B. Sir (1964). The life of insects. Weidenfeld & Nicholson, London

External links

- Insect stages (http://www.microscopy-uk.org.uk/pond/insects.html) - "Some larvae, nymphs and adult insects that live in freshwater." *A UK-based web site with microscopic photos of various insects and other microorganisms as well as biological information.*

Categories: Aquatic insects