

## The Curious Case of the Caddis Fly

Caddis flies, Order *Trichoptera* are small to medium sized, moth like creatures. They have two pairs of hairy, membranous wings, and are closely related to the butterflies and moths, *Lepidoptera*, and distantly related to the True flies, *Diptera*, and the Scorpion flies, *Mecoptera*. There are 14,500 described species, with most further divided into the suborders *Integripalpia* and *Annulipalpia*, based on their mouth parts.

Caddis flies can be found worldwide near streams, ponds, lakes, spring seeps, and vernal pools, generally between May and September. There are land Caddis flies, too. *Enoicyla pusilla* (family *Limnephilidae*) are found in the United Kingdom in Worcestershire in oak woods.

One or two generations are produced a year, with one being most common at high altitude. They undergo complete metamorphosis. The adults are short lived, with a life span of 30 days or less. The pupal stage lasts two weeks, while the larval stage overwinters. In some species the egg stage may also overwinter. The aquatic larvae are found in all of the bodies of water mentioned above.

Caddis fly larvae are of interest in that most build cases, or protective coverings. The larvae get started on their cases soon after the egg hatches.

Approximately 30 families of the suborder *Integripalpia* build portable cases. These provide protection as the larvae move about to feed. The base layer of the case is a tubular structure made of silk secreted from salivary glands near the mouth of the larvae.

There are various reinforcements on the outer surface of the silken case. These include grains of sand, larger fragments of rock, bark, sticks, leaves, seeds, and even tiny mollusk shells. The choice of reinforcements depends on the genetic makeup of the particular individual. Because of this, the larvae can often be identified down to its family, and sometimes the genus level. But in many families, and in many genera, the construction of the case varies. This may simply be a factor of the specific nature of the materials available to the larvae. Materials are selected with the legs, and if it is plant based, may be trimmed to a suitable size with mouthparts.

As the larvae grow, more material is added to the anterior end. Material may be removed from the posterior end, particularly on the portable cases to allow for greater mobility. The cases are open at both ends to allow water to flow over the gills of the larvae.

Other caddis flies, particularly the *Annulipalpia* build fixed retreats. They remain stationary and wait for food to come to them. *Psycomyiidae*, *Ecnomidae*, and *Xiphocentronidae* families build simple tube cases made of sand and other materials held together by silk.



A caddis fly case made of small pebbles, retrieved from Spring Creek, Laramie Wyoming, USA. This case was firmly attached to a rock in the bed of the creek.

Some genera can be identified by the shape of the case. Cases may be triangular, cylindrical, or almost flat in cross section. *Helicopsyche* build a case using sand grains, in the shape of a snail shell. *Neureclipsis* build a silken home that resembles a long, partially coiled trumpet. *Hydroptilidae* build a silken bean, purse, or flask shaped case, which is often covered with debris, fine sand, or algae. Others build silken trap nets to capture food particles. *Rhyacophilidae* do not build any kind of case at all.

French artist Hubert Duprat collects caddis fly cases, removes the larvae, and then provides the larvae with precious and semi-precious stones and bits of metals to produce works of art from the cases. Jewelry makers have cashed in on this idea, and at least one in the United States provide larvae with Malachite, Pyrite, and precious stones to create necklaces and earrings. Other jewelry makers use natural cases they have collected to create various baubles.

A curious creature indeed, and one that will be of ongoing interest in the science world.

By Jennie Lawrence

Comments to the author are welcomed, email - missjennae AT yahoo DOT com.

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