



**Stream Team Academy
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Collect this entire educational series for future reference! Contact us at 1-800-781-1989 if you'd like a copy of previous Fact Sheets or a binder for storing them.

The aquatic larva of a sialid species collected from LaBarque Creek. (Photo by Darlene Haun, Missouri Department of Conservation.)



LIFE CYCLES & NATURAL HISTORY OF AQUATIC INSECTS

Part 7 – The Dobsonflies, Fishflies, and Alderflies (Megaloptera)

An Educational Series For Stream Teams To Learn and Collect

By Paul Calvert

The Megaloptera is a small order comprised of two families, the Corydalidae (dobsonflies and fishflies) and the Sialidae (alderflies). They are closely related to the Neuroptera (lacewings and spongillaflyies), and were previously lumped together with that order. Unlike the Neuroptera, all Megaloptera larvae are aquatic and they include some of the largest aquatic insects. The larvae of the corydalids are sometimes known as hellgrammites or toe biters.

LIFE CYCLE

Corydalids use scent in their mating rituals, while the sialids use acoustical signals like abdominal vibrations or tapping, similar to stoneflies, for mate recognition and courtship. While the larval stages of both are aquatic, the eggs, pupae, and adults are all terrestrial.

Elongated eggs are deposited in masses on vegetation overhanging the water, large rocks projecting from the water, or manmade structures, like bridge abutments. The eggs hatch at night and, after 5 to 10 days, the first instars drop into the water. Sialids appear to be photopositive, swimming toward the

light for a period of time before settling to the bottom, while the corydalids show no photopositive tendencies, burrowing quickly into the substrate immediately after hatching and dropping.

Megaloptera are holometabolous, undergoing a complete metamorphosis. Larvae go through 10 to 12 instars before crawling out of the water and onto the bank to pupate. Some have been reported to travel over 150 feet from the water's edge to accomplish this feat. Some species produce pupal chambers under stones, stumps, or detritus; others in dry streambeds or the soil. Megaloptera pupae have free appendages and the abdomen is movable, a form known as exarate. In most holometabolous insects, the pupae are capable of only limited movement. However, Megaloptera pupae are quite mobile and can defend themselves within the pupal chamber. Adults emerge after about two weeks. The process from egg-laying to adult emergence may take one to two years for sialids, and up to five years for some corydalids.

Adults are relatively short-lived, with a lifespan of just a few days. Once emerged, some are active at night while others are active during the day. Sialids do not readily fly and remain close to where they emerge. Corydalids are active fliers. They may fly some distance from the water and are generally attracted to lights. With such short lifespans, adults mate quickly and die.

HABITAT

Corydalids are typically found in well-oxygenated streams and lakes, but can also be found in productive ponds or swamps where dissolved oxygen may

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be low. Sialids are generally found in the same habitats, but require mud or silt deposits and accumulated detritus for burrowing. Although they are large invertebrates, several species can survive in intermittent streams by burrowing into the substrate during dry periods. Sialids are generally classified as burrowers, while corydalids are classified as clingers or climbers.

FEEDING

Megaloptera larvae are predacious from the time they hatch until they pupate. They are indiscriminate, active predators, feeding on aquatic insects, annelids, crustaceans, and mollusks. Because the digestive tract of adults is reduced in size, they feed only on liquids.

RESPIRATION

Megaloptera larvae can be distinguished from most beetle larvae fairly easily by their paired lateral abdominal gill filaments. These filaments



A ventral view of a hellgrammite. Note the large mandibles and tracheal gill tufts. (Photo courtesy of Jason Neuswanger, Troutnut.com.)

may be simple or segmented and, in certain corydalids, are supplemented with tufts of tracheal gills to increase the surface area for oxygen transfer. Some corydalids also have functioning posterior spiracles which enable them to breathe when they leave the water to pupate or when dissolved oxygen is low.

CONCLUSION

Megaloptera larvae can be good indicators of water quality. Corydalid species tend to be sensitive to changes in dissolved oxygen while sialids can be somewhat tolerant of low oxygen levels. However, the species of both families play an important role as predators in the aquatic systems where they are found.

Megaloptera is one of our most interesting insect orders. They are the only aquatic insect group that is aquatic during only the larval stage, while the remaining life stages are terrestrial. The name means “large wing” and they are known for their clumsy flight. The males are also intimidating with their large tusks or pinchers. In the aquatic macroinvertebrate world, these are our charismatic megafauna.



An adult male dobsonfly displaying large tusks. (Photo by John Abbott, University of Texas.)

Our next fact sheet will cover midges, mosquitoes, aquatic gnats, and flies (Diptera). Don't forget to send your questions to streamteam@mdc.mo.gov or call 1-800-781-1989.

Sources:

Freshwater Macroinvertebrates of Northeastern North America. Barbara L. Peckarsky et al. 1990.

Aquatic Entomology—the Fishermen's and Ecologists' Illustrated Guide to Insects and Their Relatives. W. Patrick McCafferty. 1998.

