

Dragonflies (and Damselflies) Underwater

If you attended Kathy Biggs' talk about dragonflies at FOSC's May 21 meeting, you learned a lot about these beautiful predators. Among the many interesting aspects is that over half their lives take place under water. The juvenile forms of dragonflies and their relatives, damselflies, are aquatic insects that live in Sausal Creek, hunting smaller aquatic insects among the rocks at the bottom of the creek.

The bioassessment group often comes across damselfly nymphs in our samples from the creek. Less often, we find dragonfly nymphs. They indicate good water quality because predators must have other insects to eat, which also need food to eat—an aquatic habitat. When we find damselfly nymphs we also find mayfly nymphs and blackfly larvae and other aquatic insects.

Both dragonflies and damselflies are members of the insect order Odonata, derived from the Greek "*odonto*"—meaning tooth—which refers to the strong teeth found on the mandibles of the adults. Both the juvenile and adult forms have big eyes, the better to hunt down their prey. And the juvenile forms of both have a unique, hinged jaw that can whip out and capture prey.



Check out this YouTube video of a damselfly nymph capturing prey:

<http://www.youtube.com/watch?v=Y8ilOUEvzVs>

Damselfly nymphs have three feather-like gills (for breathing under water) at the end of their abdomens.



The damselfly nymph on the left was captured (and later released!) in Sausal Creek in Dimond Canyon. The three feather-like structures are the gills.

The dragonfly nymphs' gills are internal, and are called anal gills. To obtain sufficient oxygen for the hunt, the nymph sucks water in through the anal opening, where the gills are lined up in sheets, then pushes the water back out to propel itself forward. A YouTube video beautifully demonstrates their ability to jet around under water: <http://www.youtube.com/watch?v=cEgZL32HSxo>



The dragonfly nymph in the upper left photo is from the Monterey restoration site, on Palo Seco Creek, and is about 1.5 inches long. The baby dragonfly nymph in the lower left photo was found in Dimond Canyon, just above the El Centro crossing, and is only about 1/4 inch long. Both have big eyes, little antennae, and spiky tails.

We call the juvenile forms nymphs rather than larvae because the odonates undergo incomplete metamorphosis. That is, the juvenile looks like the adult, but without wings. In contrast, butterflies and moths undergo complete metamorphosis, changing completely from a wormlike larva that looks nothing like the adult.

When the dragonfly nymph is ready to become an adult, it splits out of its old skin in an amazing transformation to the flying adult. A remarkable YouTube video shows these transformations: <http://www.youtube.com/watch?v=v44soEfMUL8>. As Kathy Biggs demonstrated the adult form is an agile and deadly flier.

It's easy to see the flying adult forms of both. Dragonflies hold their wings straight out while resting, while damselflies fold their wings back over their bodies. It's harder to see the juveniles living among the rocks and water weeds at the bottom of the creek. You can try turning over a rock in the creek and looking for motion, but you will probably first see mayfly nymphs, a big part of the damsel and dragonfly nymph diet. The odonate nymphs stay in the background, waiting to rush out and claim their victims.

--Kathleen Harris