

Odonata

Dragonflies and Damselflies

The name Odonata, derived from the Greek "*odonto-*", meaning tooth, refers to the strong teeth found on the mandibles of most adults.



Classification & Distribution

Life History & Ecology

Physical Features

Economic Importance

Major Families

Bug Bytes

• Classification & Distribution

Hemimetabola

- incomplete development (egg, nymph, adult)
- immatures are aquatic (naiads)

Paleoptera

- primitive wing structure and venation
- lacking the ability to fold the wings over the back

The Odonata are divided into two suborders:

- **Zygoptera** (damselflies) -- front and hind wings are similar in shape
- **Anisoptera** (dragonflies) -- hind wings are broader near the base than the front wings

Distribution: Common in fresh-water habitats worldwide.

	North America	Worldwide
Number of Families	11	29
Number of Species	407	>5000

• Life History & Ecology

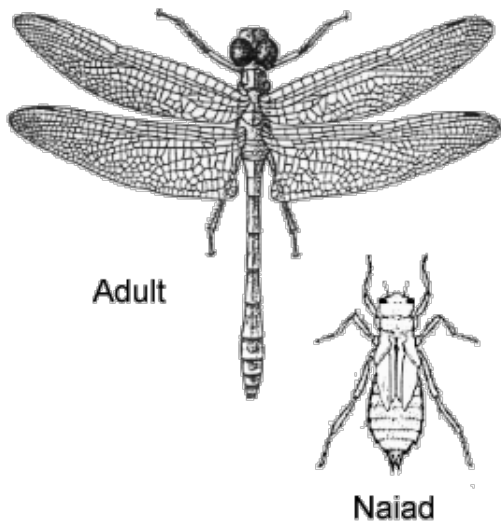
Dragonflies and damselflies are predaceous both as immatures and adults. The adults are quick, agile fliers that are generally considered beneficial because they feed on large numbers of small, flying insects like gnats and mosquitos. Legs are used either as a basket for catching prey or as grapples for clinging to emergent vegetation. Eggs are laid singly in fresh water; females often hover over open water and dip their abdomen as they oviposit.

Eggs hatch into aquatic immatures (naiads) that feed opportunistically on other forms of aquatic life including mayfly naiads, small crustaceans, annelids, and mollusks. Some of the large dragonfly naiads will even attack small fish and tadpoles. All immature Odonata have a specialized labium for catching prey. Folded under the head and thorax when not in use, the labium can be extended rapidly toward potential prey. Hooked lobes at the tip of the labium grasp or impale the prey and draw it back to the mouth as the labium retracts.

Damselfly naiads are usually more slender than dragonfly naiads and have three leaf-like gills at the end of the abdomen. Dragonfly gills are located internally, within the rectum, where bellows-like contractions of the rectal muscles cause oxygenated water to circulate in and out.

• Physical Features

Dragonflies



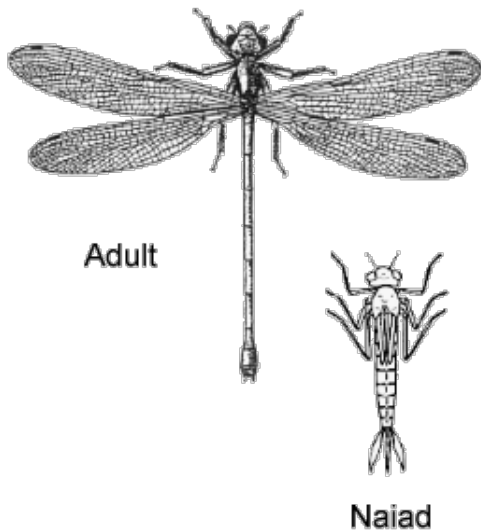
Immatures:

- Labial "mask" adapted for catching prey
- Body robust

Adults:

- Antennae short and bristle-like
- Compound eyes large, often covering most of the head
- Four membranous wings with many veins and crossveins
- Base of hind wing broader than forewing
- One distinctively pigmented cell (stigma) on leading edge of wing
- Abdomen: long and slender

Damselflies



Immatures:

- Labial "mask" adapted for catching prey
- Three leaf-like gills at rear of abdomen
- Body usually long and slender

Adults:

- Antennae short and bristle-like
- Compound eyes large, often covering most of the head
- Four membranous wings with many veins and crossveins
- Base of wings narrow, stalk-like
- One distinctively pigmented cell (stigma) on leading edge of wing
- Abdomen: long and slender

• Economic Importance

Most dragonflies and damselflies are regarded as beneficial insects because they feed on small flying insects such as mosquitoes. They may also catch and eat honey bees -- then they are regarded as pests by the beekeepers. In some parts of Europe, dragonflies are considered a threat to the poultry industry because they transmit *Prosthogonimus pellucidus*, a parasitic flatworm. Dragonfly naiads become infected by ingesting cysts of the flatworm. These cysts survive into adulthood of the dragonfly and may spread to birds (particularly poultry) that catch and eat the adult dragonflies. The flatworm cysts dissolve in the bird's intestine and infection spreads into the cloaca and reproductive organs. The Dutch have a maxim: "Hide the hens, the dragonflies are coming."

• Major Families

Dragonflies

- **Aeshnidae** (Darners) -- These insects are notable for their large size and brilliant blue or green coloration. Includes the common green darter (*Anax junius*).
- **Libellulidae** (Common Skimmers) -- This is the largest family in the order. It contains many species with dark spots on the wings.
- **Gomphidae** (Clubtails) -- These dragonflies have the terminal abdominal segments swollen, hence the common name.

Damselflies

- **Calopterygidae** (Broadwinged Damselflies) -- The wings of these insects are shaped like the seeds of a maple tree.
- **Coenagrionidae** (Narrowwinged Damselflies) -- Small, delicate insects. The body is usually black with blue markings. At rest, the wings are held

together over the back.

- **Lestidae** (Spreadwinged Damselflies) -- These damselflies rest with the body nearly vertical and the wings partly outspread.

• Bug Bytes

- The compound eyes of some dragonflies may have up to 28,000 facets.
- Some naiads can shoot out their labium and catch prey in only 25 milliseconds.
- Scientists have documented large-scale migrations of dragonflies. One swarm was observed 1,400 km off the coast of Australia.
- Some immature damselflies establish feeding territories, areas that are defended against invasion by other conspecifics. Territorial species develop more rapidly and produce larger adults than other non-territorial species.
- Many adult male dragonflies establish and defend territories along the perimeter of a lake or stream. Females will mate only with males that hold a territory, so population density is somewhat regulated by territory size.
- Male Odonata have claspers at the end of their abdomen, but no external genitalia. Before finding a mate, a male attaches a spermatophore to his second abdominal segment. He then grabs a female around the neck with his claspers and she retrieves the spermatophore with the genital opening of her abdomen.
- Most dragonfly naiads can move forward by "jet propulsion". Rapid contraction of the rectal muscles forces water out the rear end and shoots the insect forward.
- Male damselflies (and perhaps some dragonflies) have a special flagellum associated with the copulatory organ that can reach into a female's body and remove sperm deposited by another male in a previous mating.
- Dragonflies are known by many interesting common names, including "snake doctors", "devil's darning needles", and "mosquito hawks".