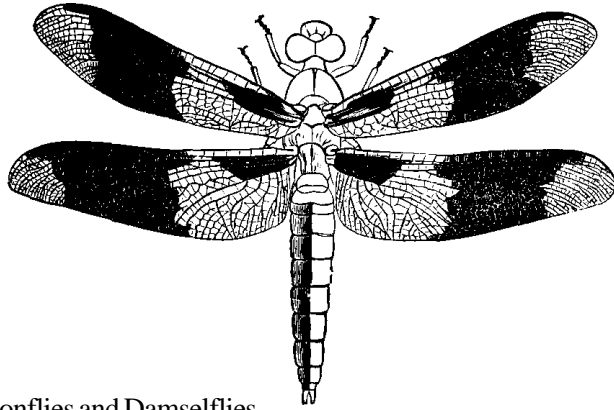




Dragonflies and Damselflies



Dragonflies and Damselflies are collectively known as the Odonata. These often large and beautifully-colored insects spend much of their time on the wing, capturing other insects, especially small flies, for food. The immature stages are found in a variety of aquatic habitats. Odonata range in size from 3/4 of an inch to over 5 inches long. A fossil dragonfly was found to have a wingspan of about 27 inches!

In North America, there are 7 families of dragonflies (suborder Anisoptera) and 3 families of damselflies (suborder Zygoptera) All 10 families are present in Michigan and we have about 160 species represented. These very beneficial insects are exciting to watch and are often good subjects for behavior studies. Odonata are capable of moving all four wings independently, and have nearly 360° vision. Dragonflies can fly backwards, upside down, and are our most impressive insect aerialists. The adults can fly quite far from a body of water, and some species, such as the Common Green Darner (*Anax junius*) migrate long distances in the spring and fall. Damselflies tend to stay near the sites where they oviposit.

Mating for both dragonflies and damselflies usually occurs near the sites in the water where the females oviposit, and in many species, males remain attached to females while eggs are laid. Mating is a complex process in the Odonata. Males transfer sperm from the genital opening at the tip of the abdomen to a secondary sex organ (hamules) located on the second abdominal segment. The male's terminal appendages latch onto the back of the head of the female and she then curls her abdomen forward so that the male's hamules clasp the vaginal opening of the female. The sperm is then transferred into the female and copulation is complete. This is the "wheel" or "heart" position that we often see. The "lock and key" structure of the hamules are diagnostic characters useful for identification.

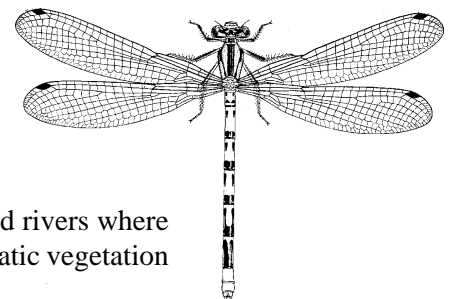
The aquatic larvae (or nymphs) have a prehensile lower lip that can reach out and catch prey when it comes within striking distance. Anisoptera larvae have internal gills, and Zygoptera larvae have external gills at the tip of the abdomen. Many larval Anisoptera are capable of "jet propulsion" by shooting water out of their rectal opening.

ANISOPTERA - Dragonflies

- Petaluridae - Petaltails - ancient lineage of dragonflies usually restricted to seeps and springs.
- Aeshnidae - Darners - some of Michigan's most common dragonflies, found in many aquatic habitats. Michigan's largest dragonfly, the Swamp Darner (*Epiaeschna heros*), belongs in this group.
- Gomphidae - Clubtails - primarily stream and river species, some are found in lakes. Usually black and green.
- Cordulegastridae - Spiketails - primarily found along streams and small rivers.
- Corduliidae - Emeralds - found in a variety of habitats, mostly ponds and lakes. Many species are uncommon and restricted to northern habitats. Hine's Emerald (*Somatochlora hineana*) is a species on the Federal Endangered Species list.
- Macromiidae - River Cruisers - these strong flyers are usually found along rivers.
- Libellulidae - Skimmers - these are primarily pond and lake species. Often seen perching on top of vegetation. Many are colorfully patterned in the wings or body. Michigan's smallest dragonfly (22 mm wide) is the Elfin Skimmer, *Nannothemis bella*.

ZYGOPTERA - Damselflies

- Calopterygidae - Broad-winged damselflies - found along streams - usually have striking metallic coloration and darkened wings. The Ebony Jewelwing (*Calopteryx maculata*) is a common and very attractive species.
- Lestidae - Spreadwings - primarily pond and marsh species - adults hold wings spread out when perched.
- Coenagrionidae - Pond Damsels - primarily ponds and backwaters, but also along streams and rivers where there is sufficient aquatic vegetation and still areas.



Bluets (*Enallagma* species) are the most speciose group of Zygoptera in Michigan. They hold the wings folded over the back when perched.

OBSERVING AND COLLECTING

Odonata are quite challenging to collect, due to their excellent vision and maneuverability. The large and flashy *Aeshna* dragonflies are strong fliers and it can take some practice trying to catch them in an insect net. The best way to catch them is to sweep the net at the dragonfly from behind.

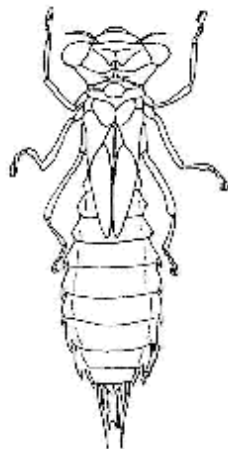
Observing adult Odonata can be challenging. Use binoculars that are capable of Ultra-Close-Focusing (usually referred to as UCF) and have 7x or 8x magnification. The real challenge is to keep an individual in focus. Often, it is best to watch with your unaided eyes and then train the binoculars on the dragonfly once it has perched or landed. Just watching these interesting insects can be rewarding. There are many territorial disputes among males, feeding activities, mating rituals and other behaviors that are fascinating to watch.

Many dragonfly species are identifiable through binoculars once you have become familiar with the fauna and can refer to an authoritative guide. However, be aware that many species can only be reliably identified in hand, because male genitalia are often the definitive characteristic that separates closely-related species. For the smaller damselflies, it is nearly impossible to field-identify many species without capture and close examination. For example, there are many species of *Enallagma* damselflies, and although a few are readily sight-identified by experienced people, some species need to be captured and looked at under 20x magnification before their identity is certain.

Collecting nymphs is accomplished by dragging an aquatic net through aquatic vegetation and along the bottom of a stream or pond. They are interesting to observe in a small aquarium. Some species are sprawlers, meaning that they tend to lie flat on the bottom and lie in wait for a prey item to approach. Others, such as larger *Anax junius* nymphs, are active hunters and can stalk their prey. Damselflies tend to grab onto aquatic vegetation and walk slowly, since they can be the prey as well as the hunter.

PRESERVATION

Adults are preserved by first placing them in glassine envelopes or paper triangles and then immersing them in a large jar of acetone. This kills them quickly and preserves the colors better than any other method. Remove the specimens after 12 hours and allow them to air dry outdoors or in a well-ventilated area. Adults may be pinned or placed in envelopes. Pin the adults on their side, not dorsoventrally like butterflies. This saves space,



and allows them to be placed in envelopes later on, if desired. Specimen envelopes are usually 3x5 in. and made of clear cellophane, mylar, or glassine paper. An index card with the collecting data and identification is placed behind the specimen in the envelope. Nymphs may be preserved in 75% ethanol. For more complete information on collecting, preserving, and studying Odonata, go to the Michigan Odonata Survey web pages at:

insects.ummz.lsa.umich.edu/michodo/mos.html.

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