



Dragonflies and Damselflies



Widow Skimmer (Libellula luctuosa).
Photo by Darrin O'Brien.

Dragonflies and Damselflies make up the order Odonata. In North America, there are seven families of dragonflies (suborder Anisoptera) and four families of damselflies (suborder Zygoptera). Ten of these families are present in Michigan and we have about 170 species represented. The current state checklist is available at the Michigan Odonata Survey website: <michodonata.org/michigan-checklist/>.

These insects are exciting to watch – they are often large and beautifully-colored and spend much of their time on the wing, capturing other insects for food. 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 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. The more delicate damselflies, on the other hand, tend to stay near their breeding sites.

Mating for dragonflies and damselflies usually occurs near water, at the sites where the females oviposit. Mating is a complex process in 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.



Eastern Red Damselfly (Amphiagrion saucium) in a mating wheel. Photo by Julie Craves.

Many species of Odonata lay their eggs directly into the water. Others may oviposit into vegetation under, near, or overhanging the water, and still others in substrates such as rotted logs. In some species, males remain attached to the females while eggs are laid.



Lyre-tipped Spreadwing (Lestes unguiculatus) with female ovipositing into a stem. Photo by Darrin O'Brien.

Upon hatching, all Odonata develop in water. The immature stages are found in a variety of aquatic habitats. Odonata 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.



Nymph of a clubtail in the family Gomphidae. Photo by Darrin O'Brien.

Some Odonata species develop rapidly, emerging as adults within weeks or a few months. Other species may spend multiple years as aquatic nymphs, molting a number of times as they grow. When it is time to emerge, the nymphs crawl out of the water and molt a final time. It may take some hours before the adult bodies and wings harden sufficiently so that they can fly away, leaving behind the hollow

exoskeleton known as an exuvia. Documenting locations where exuviae are found establishes with certainty places where particular Odonata species breed. For more information, see Entomology Note No. 26, Collecting Odonata Exuviae (available at the [Michigan Entomology website](http://MichiganEntomology.com)).



A newly emerged Harlequin Darner (Gomphaeschna furcillata) clings to its exuvia. Photo by Darrin O'Brien.

Many dragonfly species are identifiable with 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 example, it is nearly impossible to field-identify many damselflies without capture and close examination. Many species of *Enallagma* damselflies, or bluets, often need to be captured and looked at under 20x magnification before their identity is certain.



Familiar Bluet (Enallagma civile). Photo by Darrin O'Brien.

Odonata are quite challenging to catch, due to their excellent vision and maneuverability. Many 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. For more complete information on collecting, preserving, and studying Odonata, go to the Michigan Odonata Survey web pages at: michodonata.org.

USEFUL REFERENCES

Books

- DuBois, R. 2019. Damselflies of Minnesota, Wisconsin & Michigan. Kollath-Stensaas Publishing, Duluth, MN.
- Mead, K. 2017. Dragonflies of the North Woods, 3rd ed. Kollath-Stensaas Publishing, Duluth, MN.
- Paulson, D. 2012. Dragonflies and Damselflies of the East. Princeton Univ. Press, Princeton, NJ.

Websites

- Michigan Odonata Survey <michodonata.org>
- Odonata Central <OdonataCentral.org>
- Dragonfly Society of the Americas <dragonflysocietyamericas.org/>

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